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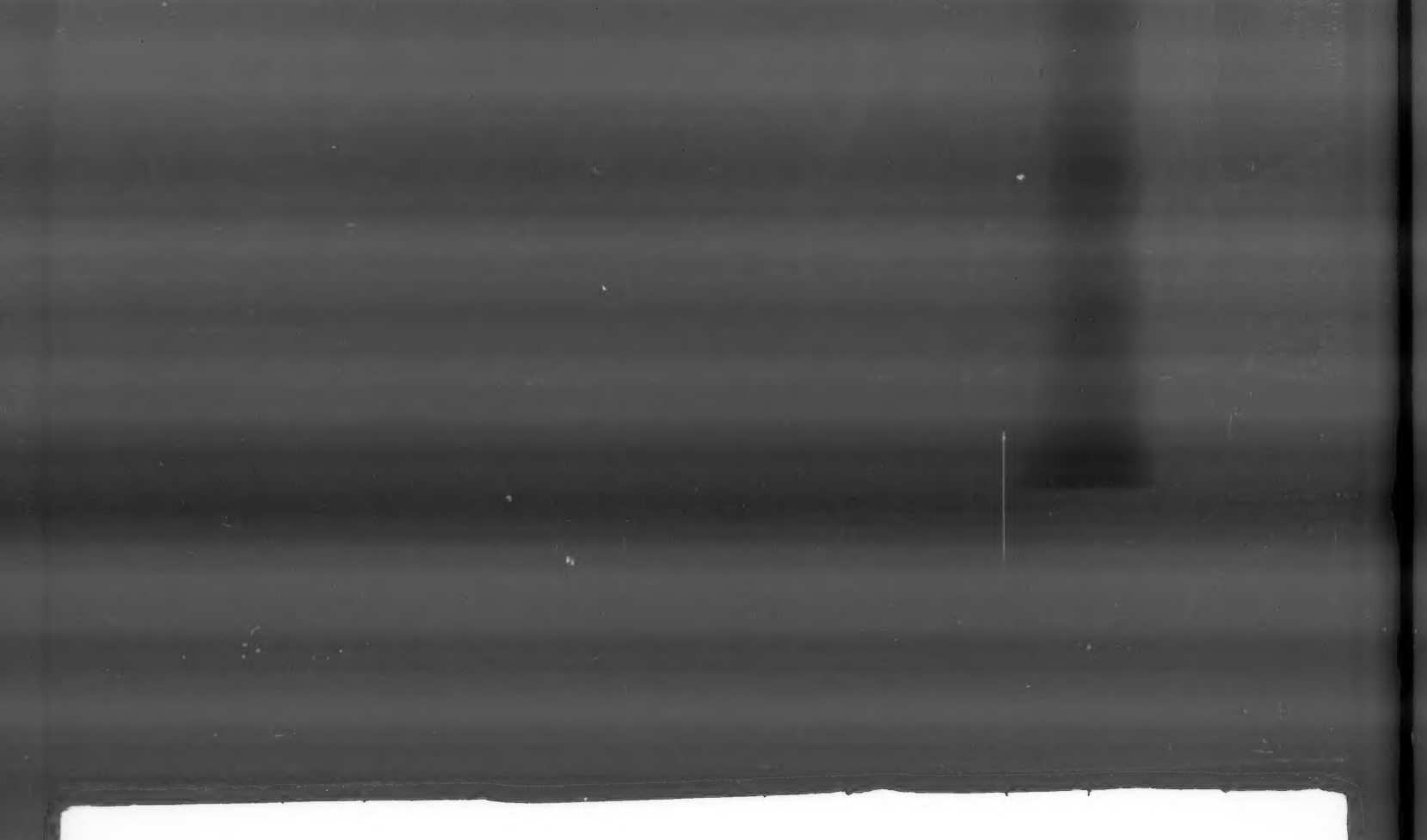

THE
QUARTERLY JOURNAL
OF
ECONOMICS

FEBRUARY, 1921

THE ECONOMIC AND FINANCIAL POSITION OF FRANCE IN 1920[1]

SUMMARY

The political and social situation in France at the end of 1920, 175. — All classes dissatisfied, 177. — A social or political revolution improbable, 178. — The critical economic position: agriculture, steel, coal production, 180. — Foreign trade, exchanges, prices, 182. — The financial situation alarming. — Public expenditure and public revenue during the war, 185. — The public debt, 191. — The financial policy of the administrations during the war and since the armistice, 191. — The burden of the taxpayer in France, 205. — The future financial position of France depends on four matters: reduction of expenditure, reduction of the foreign debt, German reparations, stabilization of the exchanges, 206.

I. The General Situation

France has issued victoriously from the greatest war of all history. She has emerged greatly enfeebled economically. None of the belligerent nations spilt as much blood as France. France has a population of 39 millions; the dead number almost 1,500,000 and the mutilated and seriously wounded exceed that number. No other country underwent the terrible and systematic devastation which laid waste the North and East of France — the richest regions, industrially and agriculturally.

[1] Translated by Herbert Feis.

On Armistice Day, November 11, 1918, the financial situation was very grave. The war was the chief cause of the situation; but a bad policy of public finance played its part also. That situation has grown steadily worse since November 11, 1918; the poor financial management of the French government is one of the reasons. I will return to that subject later on.

The selfishness of the Allies is another reason, no less certainly. The financial assistance which, in exchange for sacrifices of men, the Allies gave France while hostilities were on, was stopped abruptly. Each country looked out for itself. Once the common peril had passed and victory was assured, each power sought to make the greatest possible profit from the victory, and to take upon itself the smallest possible share of the financial burden which had been incurred for the safety of all. National selfishness, which all but led to military defeat during the war, governed the course of events after 1918; it still prevails. France has suffered and now suffers terribly from that political selfishness, as well as from the military, economic, and financial isolation to which the Allies have left her since the end of 1918.

Almost alone France keeps guard over the Rhine, and uses thus many thousands of men who could be carrying on the work of peace.

The treaty of Versailles rightly put upon conquered Germany the whole of the costs of restoration; but up to the present France has received nothing. She alone is financing the formidable work of restoration of the regions devastated by war. Besides this, she has to "finance" Germany, to act as banker to Germany in order to obtain a part of the coal which Germany is obligated to deliver to her by the treaty of Versailles. That is not all. Because her coal mines were systematically destroyed by the Germans, France is com-

pelled to buy a great amount of coal from England. The British government, taking advantage of this urgent need and of the fact that she has practically a monopoly, has imposed heavy charges upon coal exports; thus the French consumers are made to carry a considerable part of the financial burdens of England.

Due to this combination of causes, French exchange has declined greatly with reference to the dollar, the pound sterling, the Swiss franc, the Spanish peseta. At the same time her financial burdens — public and private — have become much heavier, and her public expenditures have greatly increased.

Despite everything, the political and social situation has been quieter than that of most of the states of Europe. There is not, at this time (October, 1920), any sign of political revolution or serious social disturbances upon the horizon.

That does not mean that the French are satisfied. Far from that. The end of the war was the beginning of a period of disillusionment for all classes. Among the possessing classes the hope, which M. Clemenceau's administration took pains to sustain, that the treaty of peace would bring a remedy, that it would make conquered Germany pay the costs of the war, has met with disappointment; each day it grows less. The treaty of Versailles proclaims clearly the principle of German responsibility, but it does not offer the means of realizing that responsibility in practice. And the non-payment by Germany means heavier and still heavier taxes for the French tax payer. That is the fearful prospect which explains the present state of unrest in France and the disagreements with England which occasionally arise. That power does not seem to understand the reasons for the firm attachment of the French govern-

ment to the treaty of Versailles. That attachment — even if it can be criticized — represents the feeling of the majority of the people. These disagreements do not affect the Entente, which the immense majority of Frenchmen stoutly uphold as the safeguard of the world's peace.

The disillusionment of the working classes is no less real; the consumption taxes levied in June, 1920 have led to a further increase in the cost of living. Furthermore, the promises affirmed many times by the rulers in the course of the war to undertake, once peace was at hand, an improvement in the social condition of the workers have not been carried out; the actual rulers, since the general elections of November 16, 1919 even have a strong reactionary leaning. Despite all official pronouncements they are striving to keep the laboring class in its pre-war position, and they are attempting even to take back some of those rights which were won before or during the war. Therefore social antagonisms are much more aroused than before the war. The "holy" union is no more.

For all that a social or political revolution is decidedly improbable. That is because the great victor of the war, the French peasant, is definitely opposed to it. The blood of the French peasant poured out in streams during the war. It is this peasantry which represents politically the greatest actual electoral power.

In France, without doubt, the land is more widely parceled out than in any other country in the world. That makes for political and social stability. That explains why the French peasant, having become the proprietor of land since the revolution of 1789, has been conservative in political and social affairs. It is never he who, in the course of the nineteenth century, has caused revolutions or taken the lead in social reforms; he has submitted to them first; he has profited from them later.

At the present time, the traditional conservatism of the peasant has been increased by the war. The profits which the farmers have been able to make because of the tremendous rise in the prices of agricultural products have enabled them to increase their holdings, to free their lands of the mortgages which burdened them. The class of small landed proprietors is more powerful than ever. Its representatives who are in the majority in both Houses of Parliament have, up to the present, made use of that power to gain valuable financial advantages (a guaranteed price for wheat) and to enable this class to escape from carrying an equitable share of the taxes imposed to meet the financial costs of the war. Furthermore, the propertied classes have not missed their chances of stimulating the conservatism of the French peasant, by stirring him up against the laborer. "During the period of hostilities" he has been told time and again that "the laborers employed in the munition factories have been sheltered from death and have received very high wages while the peasant went out to be killed for five sous a day. Now that the war is over, the laborer desires the suppression of all private property, *as in Russia.*"

The leaders of the unified socialist party have made it easier to carry on that campaign by making the most clumsy political blunders. They have extolled, or at all events, spoken with favor of the ways of Russian Bolshevism — communistic, and a repudiator of the public debt; they have contemptuously rejected all political alliances with the radicals.

The peasant voters, the small bourgeois holders of Russian securities, the wealthier upper middle class were called upon to make their opinions clear on November 16, 1919. With the aid of a new electoral law which favors the cause of wealthy candidates, and out of fright

at Bolshevism — which was supported, Mr. Clemenceau said, by the socialists — a crushing beating was given the socialists and radicals. The conservative party won a striking and unlooked-for victory

Due to these various causes, the strikes undertaken by the workers in May, 1920 were very harshly suppressed by the government, with the support of a great section of public opinion. The conviction has become deep in the ranks of the workmen that no radical change in the position of the wage earners has a chance of being successfully accomplished at the present time.

Such, in general outline, is the political and social position in France at the end of 1920.

II. The Economic Position

France faces an economic crisis. Agricultural and industrial production has fallen off greatly as compared with the pre-war situation. The balance of trade is very unfavorable. The exchange value of the franc has depreciated greatly.

The volume of agricultural production is much smaller than before the war, as can be seen by the facts given in the following table, the items of which may serve as examples.

Millions of quintals or hectoliters

Years	Grain	Potatoes	Beet root		Green fodder	Wine
			for sugar	for fodder		
1913.....	96.9	135.9	59.4	252.2	156.2	
1914.....	76.9	120.0	37.5	198.6	137.3	59.9
1915.....	60.6	94.0	11.5	146.6	111.0	20.4
1916.....	55.8	88.0	19.9	154.9	111.1	36.0
1917.....	36.6	104.0	19.7	165.4	97.7	38.2
1918.....	63.6	65.0	11.4	108.2	83.3	45.0
1919.....	50.0	77.0	10.8	104.9	59.6	51.5

	Horses	Million Cows	Pigs
1913	3.1	16	7
1914	2.1	12	5.9
1918	2.2	12.3	4
1919	2.4	12.4	4

Industrial production is no less affected. At the present time (October 6, 1920) it seems as if a crisis was ahead. Because of the lack of coal and coke many important furnaces are extinguished or are only partly employed. The amounts (in millions of tons) of coal and coke consumed in France before, during and after the war, are as follows:

COAL

Years	Available product of the French mines	Imports	Total
1913	35.8	18.7	54.5
1915	16.9	18.8	35.7
1916	18.2	18.7	36.9
1917	24.8	15.1	39.9
1918	22.1	15.9	38.0
1919	15.9	21.4	37.3

The monthly average was about 4.5 millions in 1913; in 1919, it was not more than 3.1 millions; for the first five months of 1920 even with the coal from the Saar, it has only been 3.1 millions.

As for coke before the war the monthly average was 583,300 tons; for the period 1915–17, this monthly average was 220,000; in 1918, 158,800; in 1919, 219,540; and for the first five months of 1920 it has been 350,000 tons.

The production of pig iron and of steel has been as follows (in millions of tons);

	Pig Iron		Steel	
Year	French production	Imports	French production	Imports
1913	5.2		4.7	
1917	1.4	0.7	2.0	2.2
1919	2.4	0.1	2.1	1.2

For the first five months of 1920, the production was about half the pre-war quantity.

The critical position of the railroads is one of the indications as well as one of the causes of the economic crisis. In 1913, the daily average of traffic moved was 60,700 loaded ten-ton cars; during the war this average fell to 50,000; in 1919 it ranged between 29,000 and 36,000. The daily average from January to June, 1920 was 33,313 — a little more than half the pre-war traffic.

Lastly, look at the following statistical summary of French foreign trade, before and after the war (expressed in millions of francs):

Period before the war	Imports				Exports			
	Food-stuffs	Raw materials	M'f'd goods	Total	Food-stuffs	Raw materials	M'f'd goods	Total
1911	2,020	4,525	1,520	8,065	736	1,830	3,509	6,076
1912	1,803	4,813	1,614	8,230	849	1,944	3,917	6,712
1913	1,817	4,945	1,658	8,421	838	1,858	4,183	6,880
Period after the war								
1919	8,629	13,221	7,927	29,778	969	1,936	5,806	8,713
1920 (Jan. to June)	3,846	7,697	4,087	15,630	795	2,008	4,689	7,492
1919 (Jan. to June)	4,000	5,852	3,870	13,722	318	424	1,703	2,445

The progress of the export trade in 1920, as compared with 1919 is considerable. But the balance of imports over exports is still very heavy, and no balance of payments due is established, as it was before the war, by the interest due upon French capital investments in other countries. Much French capital, which was invested in foreign securities, yields interest no longer.

The falling off of production and the depreciation of the coinage have resulted in a fall in the value of the franc as compared with the dollar, the pound sterling, the Swiss franc, and the Spanish peseta — especially since the end of 1919. The *maximum* value attained by

these foreign currencies as compared with the franc during this period is as follows (foreign money in terms of francs):

	New York	London	Switzerland	Spain
June, 1914	5.15	25.19	99.87	97.40
June, 1919	6.50	30.00	123.50	130.75
March, 1920....	14.97	58.10	260.00	259.50
April, "	17.08	67.45	309.00	300.00
May, "	16.65	63.81	294.00	280.00
June, "	13.22	52.21	240.25	218.50

With these causes at work, prices have risen prodigiously since the declaration of peace. The index number of wholesale prices in France show the following, as compared with that of the United States (figures taken from the *Statistique Générale* for France, and from Dun's for the United States). The average of 1901–10 is taken as 100.

Years	France	United States
1913.....	115	111.4
1914.....	118	114.8
1915.....	162	119.0
1916.....	218	139.8
1917.....	302	191.4
1918.....	392	215.4
1919 (2d quarter).....	412	216.9
1920 (June).....	628.2	245.4

To the causes of increased prices already considered must be added the heavy consumption taxes levied under the laws of the 25th of June and the 3d of July, 1920; these have made the price situation even more critical. If the index numbers of wholesale and retail prices in France during the first eight months (January to August) of 1920 are studied in detail, and if a comparison is made with the preceding months, a slight lowering of prices will be observed, then an upward recovery of wholesale prices and a very sharp increase in retail prices.

It cannot be doubted that the rise in the price of bread is one of the causes; but it is beyond dispute that the tax upon business transactions also plays a part.

Below is given the index number of wholesale and retail prices of foodstuffs (20 commodities), raw materials (25 articles) and of the two sets combined (45 articles). The figures are taken from the *Statistique Générale* of France.

PRICE MOVEMENTS IN FRANCE

I. *Index of wholesale prices (45 articles)*

Base 1901–10 = 100

1920	Foodstuffs (20)	Raw materials (25)	Combined (45)
January	509.7	605.2	562.7
February	548.3	647.2	603.3
March	576.9	692.3	641.0
April	586.5	753.4	679.2
May	546.3	707.5	635.9
June	502.8	623.1	569.6
July	500.0	624.6	569.2
August	499.9	647.0	581.6

II. *Index of retail prices (13 articles)*

(*a*) Collection of cities other than *Paris* (according to the price figures given by the mayors). *The whole of France*

First 3 months 1920	3.210 [1]
Second 3 months 1920	3.799 [2]
Third 3 months 1920	3.898

(*b*) *Paris* (according to the prices of a large coöperative society)

1920	January	3.119	290
	February	3.195	297
	March	3.646 [2]	339
	April	3.852	358
	May	4.069	378
	June	3.967	369
	July	4.006	373
	August	4.014	373

[1] Price of bread not changed. [2] Price of bread changed.

The price situation became so acute in October, 1920, that the government stirred itself and announced in long communications to the newspapers its intention of conducting an energetic campaign against high prices. "The Council," the official communication states, "has worked out a series of measures calculated to check the rise in the cost of living and to assure a more plentiful and cheaper supply of the necessary articles of consumption" (decision of the Council of Ministers, Oct. 12, 1920). Among those measures there are none which affect the fiscal régime. Is there not a striking contradiction between the financial policy of crushingly high consumption taxes and economic nationalism on the one hand, and these declarations of intention to reduce the cost of living on the other hand? As happens too often in all countries, the French government seems to believe that economic problems can be overcome by words.

III. The Financial Situation

The financial position of France at the end of 1920 is very alarming. Expenditure greatly exceeds revenue. The public debt is colossal. Tax burdens are ruinous.

The statistics which follow, while taken from official sources should not be taken as rigorously exact. They should be taken simply as giving a general outline of the situation. The French system of public accounting does not allow us to draw up a precise balance sheet of the war. Because of discrepancies in the official documents consulted, the figures obtained may differ sometimes by some millions of francs.

Before the war the public expenditure of the state approximated 5,200 million francs, having grown steadily year by year. The progressive increase of sums appropriated under finance legislation (in millions of francs) was as follows:

Year	Amount
1904	3,565
1910	4,185
1911	4,386
1912	4,497
1913	4,738
1914	5,191

During the war the sums appropriated were as follows:

Year	Amount
1914 (August 1 to December 31)	6,589
1915	22,804
1916	32,945
1917	41,679
1918	54,537

Since the war ended, the expenditure has only decreased slightly. For 1919, 49,029 millions of francs were voted in appropriations. For the first seven months of 1920, the appropriations for ordinary expenses has been 25,714 millions of francs. The budget of 1920 (estimated expenditure) at the present time (July 31, 1920) is as follows:

	Million francs
Ordinary budget	21,761
Extraordinary budget	5,420
	27,181

In these appropriations no account is taken of the expenditure for repairing the damages of war, which outlay the treaty of Versailles charges against Germany and which make up a *special budget*. The appropriations voted for that special budget total 20,566 million francs. As Germany has not yet paid over anything, this means that France will face a public expenditure in 1920 of about 48 million francs (with the reservation that Germany will have to make repayments). That figure is certainly less than the real sum, for it seems

very probable that there will be supplementary appropriations for some billions.[1]

From August 1, 1914 to July 31, 1920, the appropriations have totaled 233,300 million francs. With an annual peace budget of 5,500 million francs, six years of peace expenditure would total 33 billion francs. The costs of the war may thus be calculated as about 200 billion francs — that is, the literal expenses borne by the state.

Among these expenditures there are some the progressive growth of which is astounding. Such is the interest on the public debt. The increase was as follows (in millions of francs).

Year	Amount
1914 (5 months)	59
1915	1,899
1916	3,333
1917	4,863
1918	7,087
1919	7,986
1920 (7 first months)	6,717

From August 1, 1914 to July 1, 1920,[2] the ordinary revenue (from taxes, public monopolies, and public works) was about 43,305 million francs, which can be analyzed as follows:

Year	Amount
1914 (August 1–December 31)	1,238
1915	4,113
1916	4,640
1917	5,811
1918	6,986
1919	10,176
1920 (January 1–June 30)	6,637
	39,601

[1] For 1921 the Council of Ministers have just (October 16, 1920) held up proposals to submit to Parliament the following: ordinary budget, 22,027 million francs; extraordinary budget, 5,499 million francs; special budget, 16,575 million francs.

[2] We will note later on the estimates of revenues for the year 1920 (a budget was voted in July, 1920); taken together they total 21,770 million francs.

The special revenue (from the sale of supplies) yielded during the same period about 2,300 millions, bringing the total up to about 42 billion francs. If the revenue received in July, 1920 is included — which was 1,400 million francs a figure of 43,305 millions of francs is arrived at.

Expenditure mounted for the same period of six years to about 233 billions. The deficit was about 190 billions. The deficit has been made up by resort to the extraordinary resources of borrowing, by the emission of paper money (under the form of advances from the Bank of France) and by internal and external loans. These means can be listed roughly as follows:

Ordinary revenue	43 billions
Advances from the Bank of France	26 "
Internal long time loans	77 "
External loans	35 "
Treasury bonds	46 "

Let us analyze certain items in detail.

The emission of paper money. — The *limit* of issue of bank notes by the Bank of France was fixed by the 1911 law at 6,800 million francs. That limit was raised time and again. At various times it was fixed at:

1914.	August 5	12 billions
1915.	May 11	15 "
1916.	March 15	18 "
1917.	February 15	21 "
1917.	September 10	24 "
1918.	February 7	27 "
1918.	May 3	30 "
1918.	September 5	33 "
1919.	February 25	36 "
1919.	July 17	40 "
1920.	July 31	43 "

As a matter of fact, the amount of fiduciary circulating paper on October 7, 1920 was 39,567 million francs, and on October 11, 1920, 39,527 million francs. At this latter date, the specie reserve was—gold, 5,482 millions

(of which 1,948 millions was held abroad), silver, 263 millions.

The maximum of advances to be made to the state by the Bank of France was set in 1911, in case of war, at 2,900 millions. It has been raised in successive agreements, which were approved by Parliament. At various times it was set at:

1914.	September 21	6 billions
1915.	May 4	9 "
1917.	February 13	12 "
1917.	October 2	15 "
1918.	June 5	21 "
1919.	February 13	24 "
1919.	April 24	27 "

In January, 1920 the advances proper varied between 25,300 millions and 25,850 millions. At the beginning of the month of March, 1920, they reached the total of 26,300 millions. In April, 1920, after the floating of the 5 per cent loan they were reduced to 25,700 millions, and then to 25,300 millions; in May they rose to 26,000 millions; at the beginning of July to 26,000 millions; and on October 11, 1920 they stood at 26,600 millions.

To these sums must be added the permanent advance of 200 millions, and, finally, 3,935 millions of discounted Treasury bonds, for government advances to foreign governments. In total, the debt of the state to the Bank of France was, on October 7, 1920, about 30,835 millions of francs.

Long time loans. — The first long term loan of the war made by the French government was contracted at the end of 1915. One of the characteristics of all the war loans is the fact that the conditions on which they are contracted are onerous to the state. The system of redemption at a premium was used from the beginning; the premium rose then to about 12 per cent. But from 1917 on, the premium rose to 30 per cent, and the 5 per

cent loan of 1920 was issued with a redemption premium of 50 per cent. Furthermore all the loans have been tax free; the government has given up the policy announced in 1914 of subjecting the income from government bonds to the tax on personal property. Five loans have been issued — not including that of October, 1920 (6 per cent at par, but tax free) — for unlimited amounts; these loans have involved the state in a capital debt of a little more than 97,655 million francs for a total of 71,912 millions actually received.

The details are as follows (in millions of francs):

Year	Nominal interest	Nominal capital	Capital received
1915.....	5%	15,205	13,308
1916.....	5%	11,514	10,082
1917.....	4%	14,882	10,209
1918.....	4%	31,304	22,163
1920 (February).....	5%	24,750 [1]	16,500

Floating debt. — The principal element of the short time floating debt is the National Defense bonds, with a maximum term of one year. This treasury device, conceived by Mr. Ribot in 1914, has had a great development. On July 1, 1920 there were 44,200 million francs of National Defense bonds in circulation.

The foreign debt.—This includes (1) the bonds sold publicly in England, the United States, and Japan; (2) the bonds sent to the British treasury, the Bank of England, and the American government (representing its own bonded obligations); (3) advances by the American treasury; (4) borrowings made from American banks, either by the state directly, or by the cities of Paris, Bordeaux, and Marseilles and reassigned to the French state; (5) a series of short time credits in Spain, Sweden, Norway, England, Switzerland, Holland, and Uruguay.

[1] The burden on the state is very heavy because the 1920 loan is redeemable in 60 years with a redemption premium of 50 per cent upon the face value of the certificates.

The foreign debt rose to the sum of 34,296 million francs on July 1, 1920 — calculating foreign money at its par value. The two principle creditors are the United States (18,415 million francs),[1] and England (13,996 million francs).

On August 1, 1914, the public debt of the state was about 30 billion francs. On July 1, 1920, it was 233,429 billion francs, made up as follows:

Internal debt (including the national credit obligations for the reconstruction of the liberated regions)	121,949
Floating debt	51,464
Advances from banks (of France and Algeria)	26,020
External debt to England	13,996[2]
External debt to the United States	18,415[2,3]
Total	233,729

The increase of the public debt since the outbreak of the war has thus approximated 200 billion francs, allowance being made for the fact that France has advanced 3,880 million francs to certain Allied states.

IV. The Financial Policy of the Administrations[4]

1. When war broke out in August, 1914, the state of the public finances was bad. There was a complete contradiction between the general economic situation and the fiscal situation. The economic prosperity was great; the financial policy of the governments, for a long time past, had been bad. Through fear of being un-

[1] Before the repayment, on October 15, 1920 of the Anglo-French loan of 1915 — the French share of which is 1,295 million francs. As the repayment is covered in a large measure by renewals, that operation does not affect the position sensibly.

[2] Calculated at the par value of foreign currencies.

[3] This figure includes the bonds issued in the United States, the Anglo-French loan of 1915, the loans of the cities which were assumed by the state, advances from the American treasury, and the obligations remitted in return for American stocks.

[4] I have published, since 1914, in the Revue de Science et de législation financières a number of studies on French financial policies. These studies have been collected in a series of volumes entitled "Les finances de guerre de la France," Paris, Giard et Brière.

popular, the administrations, without exception, had multiplied expedients in order to keep the truth from the country. The budgets ordinarily wound up in a deficit in spite of the optimistic official declarations. The budget of 1914 in particular ended in a foreseen deficit of over a billion francs. In spite of everything the administrations kept repeating "No loans, no taxes." The annual deficits were covered by short term loans, the accumulation of which made up a considerable floating debt, or by anticipating the collection of money due to the state, the effect of which was to deprive future generations of their resources.

In the years preceding the war the different administrations managed by various financial devices (in particular, by special accounts) to show only a part of their expenditure in the budget. It is a very gloomy period in the financial history of France, marked by the absence of clear or sincere thinking, of candor and of courage. The ruling classes with fierce selfishness opposed all fiscal reforms which would increase their share in the public burden. They pursued with a lasting hate the upholder of these democratic reforms, Mr. Joseph Caillaux, a hate which never relaxed or shrank from using any means.

On the eve of the war, July 7, 1914, a great funding loan, 3½ per cent redeemable at par, was issued — 900 million francs at face value at a price of 91. The results were — on the surface — magnificent; the government announced that the loan had been oversubscribed many times. In reality, it was not subscribed by the public in general; the bankers, calculating to make large profits at public expense, swept aside the small capitalists by huge subscriptions, which were not genuine.[1]

[1] The war having broken out and the public debt having fallen in value (the quotations at the end of August, 1914 were down to 82 francs) the scheme did not succeed. The government, desiring the help of the bankers for the sale of their war loans, came to

2. As soon as war was declared the administration obtained extensive powers in matters of public expenditure (the law of August 5, 1914). Having taken refuge in Bordeaux before the German invasion, it rid itself cavalierly of the legislative bodies, whose intervention and control it feared. But, starting with December, 1914, it reconciled itself to the convocation of Parliament. Parliament, indeed, not having forgotten the minor *coup d'état* of which it had already been the victim, demanded a continuous session up to October, 1919.

The policy of the administration during the war period and the two years following the armistice can be divided into four large periods.

First period: 1914–16. — The period of expedients. In the first five months of the war (August to December, 1914) the *political* situation brought about by the administration made it necessary to have recourse to financial expedients for which the collaboration of Parliament was not necessary; in particular the issuance of paper money and voluntary short term loans (National Defense bonds).

During the years 1915–16 the administrations, despite the demands of the Chamber of Deputies, resorted at first almost exclusively to the financial methods which had served up to the end of 1914, to wit, the issuance of paper money and voluntary short term loans. Beginning with February, 1915, they issued longer term loans; in November, 1915 and September, 1916 they finally added to these sources of revenue perpetual loans.

their rescue. The decree of September 11, 1914, despite the recess of Parliament, resolved upon the liquidation of that loan; the most striking result was to release the bankers from their obligations and to spare them the considerable losses that the literal execution of these obligations would have meant to them. More concretely, the holders of the 3½ per cent loans, which were subject to tax, were allowed to transform them at the price of 91, into the securities of the new loans (other than Treasury bonds) — that is to say into 5 per cent National Defense bonds redeemable at par in 10 years, tax free.

As to taxation, no effort was made in 1915, despite the protest of the deputies. In the course of 1916, the administrations established or collected some additional taxes: income taxes, the war profits tax (nothing was collected in 1916) and a tax upon alcohol. In the middle of 1916, under the pressure of the Chamber of Deputies, a very conservative tax program was drawn up. But it was not until the end of December, 1916, that the most important sources of public revenue were tapped by means of new taxes.

The unwillingness of the administrations to levy taxes caused astonishment and criticism. But they kept piling up optimistic reviews of the economic position of France. Calculating upon an early end of the war, they smothered the truth under the pretext that they were preserving the morale of the country. As the president of the council, Mr. Ribot, said on June 1, 1917 — he, however, was in the government since August, 1914 — "It was a great mistake not to have confronted the country with the real truth, not to have made known to it the sacrifices which it had to carry immediately and which must grow worse as the fight continues." [2] This blindness is one of the characteristics of French economic and financial policy throughout 1915–16.

What is still more astounding is the campaign against any program of war taxation, which was energetically led by the vast majority of French economists and financiers, especially by Mr. Paul Leroy-Beaulieu:[1] "It is possible to have recourse only to expedients in war time," he said, "to loans of a provisional character." The underlying reasons for that opposition were the hostility against the reform of the income tax and the fear of compromising "union sacrée" by bringing into

[1] G. Jèze, Les finances de guerre de la France, vol. ii, p. 2.

[2] Mr. Paul Leroy-Beaulieu cast this contemptuous declaration against the very few advocates of a tax policy: "All experienced men are of the opinion that, in France, it would be premature to levy new taxation."

force a fiscal policy which might revive the violent pre-war controversies. The pretexts were the invasion of French territory and the economic and financial paralysis that it entailed.

Second period: 1917 to November, 1918 — Conservative and inadequate policy. The law of December 31, 1916 marks the first great fiscal effort of France since the start of the war.[1] The general income tax, suspended since the beginning of the war, was put in force again; tax rates on income from personal property were increased, as were also the tariff duties on colonial products, the rates on health drinks, on sugar and on tobacco. Taxes were placed upon mineral waters, on pharmaceutical specialties, on chicory and coffee substitutes, on spectacles; a new military war tax was levied upon men of military age who were not doing military service. From that time on, tax laws followed each other — doubtless inadequate; but the fiscal effort went on.

For 1917, three fiscal measures may be noted. Firstly, the law of July 31, 1917 completed the reform of the direct taxes; the schedules of the income tax, graded according to the occupation from which the income was derived, were increased; likewise the general tax on income. Secondly, a decree of October, 1917, raised the price of matches. Thirdly, the law of December 31, 1917 increased the taxes upon free changes of titles, that is upon gifts and inheritances; above all it brought into being a tax upon expenditure (the luxury tax); finally it revised the super-tax on war profits.

In the first six months of 1918, three laws were passed. Firstly, the law of January 17 increased the selling price of tobacco. Secondly, the law of April 18 contained some measures against tax frauds. Thirdly,

[1] The law of June 30, 1916 had increased the tax on alcohol; and the law of July, 1916 had established ordinary payments on war profits.

the law of June 29 raised the general income tax schedule again, the tax on property in mainmort, the stamp and registration taxes; it brought spirituous liquors under the luxury tax, increased the sugar taxes, the tax on health drinks, on chicory, on vinegar, and the transportation tax. On the whole, the fiscal effort, as customarily, consisted mainly of a wide use of consumption taxes.

Despite this lengthy enumeration of tax laws, it is not to be thought that the resources thereby created were very great. These new and increased taxes *which had been imposed from the start of the war to the end of May, 1918*, were calculated to yield the treasury for the year 1918, a little less than 2,900 million francs of new receipts, and if the receipts of the law passed June 29, 1918 are included, 3,400 million francs. For an entire year of war, the additional yield was to be higher by some few hundreds of millions of francs. In fact in the twelve months of 1918 and 1919, the total tax receipts *old* and *new* were as follows (in millions of francs):

	1918	1919
Direct taxes and other related taxes	727	733
Registration taxes	924	1,874
Stamp taxes	216	311
Tax on stock-exchange operations	2	7
Tax on income from personal property	253	290
Tax on payments	210	629
Customs duties (sugar and salt not included)	1,475	1,185
Indirect taxes (sugar and salt not included)	695	1,203
Colonial goods duties	68	103
Salt	31	32
Sugar	169	360
Matches and briquets	56	83
Tobacco	636	942
Explosives	13	20
Posts, telegraph and telephone	445	583
Divers public works	2.5	1.8
Public domain	112	99
Liquidation of supplies	..	1,192
Miscellaneous	172	350

We must take note of two types of revenue: the income tax and the super-tax on war profits.

1. *Income tax.* — That includes the general income tax and the tax on income graded according to the nature of the occupation from which it was derived. Because of the war disturbances and the invasion, the yield was not regular.

Considerable arrears still exist today (October, 1920). The statistics of arrears furnished by the administration are none too precise.

2. *Super-tax* on extra supplementary war profits. — At the end of 1919 the administration made known that the *estimates* had been put at the following figures, in millions of francs:

For the period			1916	nothing
"	"	"	1917	500
"	"	"	1918	580
"	"	"	1919	650
				1730

The decidedly predominant part played by consumption taxes is plain. The administration denied this in presenting to the Chamber of Deputies tables arranged for demonstration; the conservative parties agreed in the view that a very sound and reasonable proportion had been established. The socialist party criticized it violently. In reality, the French financial régime which was very clearly undemocratic before the war became even more so after the laws of 1916–19. Three things should be noted: first, the very small yield of the super-tax on war profits; second, the two million francs in taxes contributed by the peasants on agricultural profits (huge in reality); and third, the fact that the government loans were tax free. The legislation was plainly conservative, bringing to mind the

methods of the National Assembly after the war of 1870–71.

Third period: the armistice (November 11, 1918) to the end of 1919 — financial inaction. After the armistice, the advice of Mr. Clemenceau's administration was as follows: "There is no need of hastening to impose new taxes. Before levying fresh burdens on the French tax payer, conquered Germany must be made to pay everything that can be gotten from her as reparation for the destruction and for the unheard-of costs arising out of the criminal war she let loose." Furthermore, being on the eve of general elections (they were held on November 16, 1919) Parliament was not anxious to levy new taxes for fear of being unpopular. Thus the period from November, 1918 to the close of 1919 was a period of fiscal inaction. Furthermore, the administration did not consider it necessary to issue a large funding loan. There were no long term loans in 1919.

This double mistake — for which the associates of Mr. Clemenceau have been blamed for a long time past — has had a very serious effect upon French public finances. On the other hand expenses did not fall off greatly after the armistice; the deficit continued to reach hugh totals and the floating debt grew apace.

Fourth period: since January, 1920—heavy consumption taxes. The new Chamber of Deputies was elected on November 16, 1919, amidst a burst of violent reaction against the Bolshevist ideas which then threatened to sweep over eastern Europe, a display of scorn and hatred against the Russian communists whose treason almost led to the defeat of the Entente armies in 1918, and certainly caused the death of thousands of French soldiers on the battlefields of the Somme. The unbending stand of the unified socialists in France and their refusal to ally themselves with the radical parties,

also had an effect upon the outcome of the election. The conservative parties won a striking victory on November 16, 1919. The senatorial elections of January, 1920, maintained the same majority in power as before. Since the French Senate has always been decidedly conservative in spite of all labels, especially in financial matters, the conservative party had a great majority in Parliament. That became apparent when the question of financial remedies and new sources of revenue came up. The programme has been as follows:

1. It was decided to issue a funding loan. One was issued in February, 1920 (5 per cent interest, 50 per cent redemption premium). Its success has not been very great; it yielded scarcely enough to fund the floating debt. It has been absorbed almost entirely for current expenses. A second loan (unlimited amount, 6 per cent at par) is now being offered for subscription (October, 1920).

2. Railroad rates were greatly increased; also postal, telegraph and telephone rates, so as to reduce or do away with the deficits in operation and consequent budget deficits. The increases were often more than 100 per cent. The increase of postal rates was calculated to yield a supplementary revenue of 326 million francs in 1920, and 400 millions for a whole year.

The results of the first months of enforcement of the new schedules are far below the estimates. For the four months of August to October, 1920, the yield is more than 40 million francs less than the estimates. For a whole year, therefore, the supplementary revenue would only amount to 280 or 300 million francs, instead of the estimated 400 millions.

3. The bread subsidy was given up; or, in other words, the consumer has to pay the cost price for bread. Because of this the price of bread rose from 0.55 franc

per kilo before the law of March, 1920, to 1.30 francs per kilo in September, 1920.

4. Very heavy consumption taxes were levied. That was the object of the laws of June 25, 1920 and July 31, 1920 — the last only changing some details of the previous legislation. The new taxes or increases of taxes established by the law of June 25, 1920 should yield, in the first six months of 1920, 3,660 million francs, and for a whole year a little less than 8 million francs.

The estimates made in *June, 1920*, for the whole year were as follows (in millions of francs); this refers only to supplementary receipts expected from the new legislation:

Income tax, general and classified	1,303[1]
Gifts and inheritances	170
Changes of title involving outlay	196
Titles falling to the state	27
Stamp and miscellaneous taxes	128
Commercial transactions	5,000
Customs	236
Wines, ciders, beers, mineral waters	540
Alcohols	300
Spirits and wines *de luxe*	192
Miscellaneous Consumption Taxes	68

The fiscal policy adopted by Parliament in June, 1920, was still more conservative than that of 1916–18. That accounts for the following:

Firstly, on June 25, 1920 the super-tax on war profits was repealed, beginning with June, 1920, and it has not been reëstablished.

Secondly, the income tax was revised in such way as

[1] Made up as follows:

	(million francs)
General income tax	370
Industrial profits	300
Agricultural profits	35
Stipends and salaries	5
Non-commercial professions	2
Structures	113
Land	73
Personal property	400
Mine royalties	5
Total	1303

to make it more conservative, that is, reduce its rate of progression.

Thirdly, the taxes on gifts and inheritances have only been increased 170 million francs.

Fourthly, a tax on the volume of commercial transactions, which is in reality an expenditure tax was devised, and was expected to yield more than 5 billion francs for a normal year.

Fifthly, the other consumption taxes were increased by more than 1,400 million francs.

The socialist and radical parties protested — the first violently, the second more timidly, against this avalanche of consumption taxes. The former have advocated a levy on capital, and the latter a compulsory loan at a low rate of interest in order to pay the war debt. But while none of the partisans of the extraordinary measures except the socialists show any extreme ardor in forcing their adoption, the distinctly conservative majority have shown themselves immovably opposed to them, in the Chamber of Deputies as well as in the Senate. They believe the taxes on capital have reached their maximum. And finally the peasant class seems hostile to radical steps.

On the basis of the fiscal act of June 25, 1920 modified by the act of July 31, 1920, the estimates have been revised and the following budget has been drawn up for 1920 (fiscal act of July 31, 1920) — in millions of francs.

I. Taxes and revenues		
1. Direct taxes		
Taxes on real property		
Structures	255	
Land	152	
Industrial and commercial profits	500	
Agricultural profits	30	1824
Stipends, salaries and pensions	55	
New commercial professions	8	
General income tax	800	
Miscellaneous	24	

2. Related taxes		99	
3. Registration taxes (of which 500 millions on gifts and inheritances)		1512	
4. Stamp taxes		321	
5. Tax on stock exchange operations		16	
6. Tax on income from personal property		341	
7. Special tax on payments		516	
8. Tax on volume of commercial transactions		2084	
9. Customs		1791	
10. Indirect taxes		1535	
Of which:			
Wine and cider	462		
Beer	42		
Alcohol	430		
Railroad travel	350		
Automobiles	37		
11. Sugar tax		367	
Total of direct taxes			10,406
II. Income from state monopolies and public works			
Matches	73		
Briquets	1		
Tobacco	975		
Explosives	14		
Postal service	592		
Telegraphs	163		
Telephones	175		
Miscellaneous	4		
Total income from state monopolies and public works			1997
III. Revenue from public domains			
Other than forest lands	90		
Forests	53		143
IV. Committed routine revenues			490
V. Miscellaneous			236
VI. Extraordinary income			
Super-tax on war profits	4000		
Yield from sales of supplies	2915		8415
Surplus yield for fiscal year 1920[1]	1500		

[1] This heading requires explanation. The 1920 budget was prepared by the administration towards the end of 1919; but it was only passed by legislative bodies on July 31, 1920, after seven months' delay. During the first seven months of the financial year, the yield was considerably in excess of that forecast. This unexpected surplus was included in the budget of 1920 under the heading of "surplus fiscal yield for the year 1920." This terminology is misleading; furthermore, the surplus is really not "extraordinary income" as listed.

VII. Recoverable income in Alsace-Lorraine	76
VIII. Recoverable income from Algeria	6
Grand total of ways and means that can be included in the ordinary budget for 1920 period	21,768

It is impossible to say whether the estimates made when the taxes were voted (June, 1920) or when the budget was made up (July, 1920) will be realized in fact. It is enough to note that up to the beginning of October, 1920 the yield has been very different from that expected. Let us leave out of consideration the direct taxes which because of the revision of the law and schedules (by the laws of July 25 and July 31, 1920) were collected only at the end of the year. The income tax itself has been considerably modified in respect to its basis and schedules.

The other sources of revenue have yielded, for the first nine months of 1920, 10,373 million francs, to wit:

Indirect taxes and monopolies	8,471
State domains	76
Routine revenues which partly offset certain expenditures and miscellanies	392
Sales of supplies	1,434
Total	10,373

If the matter is examined in detail, it becomes plain that in the case of many taxes the yield has been far less than the estimates. Especially the very considerable advance in customs duties has not yielded the expected amounts. For the month of September, 1920 alone, there was a miscalculation of 12 million francs. Above all, the tax on commercial transactions, which went into force on July 1, 1920 yielded about 293 million francs for July and August, 1920, while the estimate was 700 millions. The deficit, therefore, as compared with the estimates, is 407 millions for these two months.

The administration explains this error by the following considerations. "The yield in September grows out of the transactions carried out in July and August, a time of the year when business falls off greatly, particularly during the latter month, and notably in the jewelry and jewel novelty businesses. Furthermore, a great many transactions executed in both these months grew out of sales made before the first of July, the date when the law went into effect, and transactions of that sort were considered by many debtors not to be subject to this tax and were, therefore, not included in their declarations. Finally, the public is not yet used to this new tax and numerous debtors have not complied with its obligations; only after some months of gradual development of a checking system could a normal yield be assured."

In these explanations there is much truth. It cannot be doubted, in particular, that the yield of a tax, when first it is applied, is less than its yield at a later date and less than normal yield. But the administration should count upon that in making its estimates. It is possible to question whether the estimates made of the yield of the tax on commercial transactions were not too high, and if its economic effects (price increase and cutting down of consumption) would not effect the financial yield. The question is important in view of the place which the public authorities have given to this tax. Then there is the revenue from the postal system and the telegraphs and telephones which for September, 1920 alone is 20 millions less than the estimates.

However, *all together*, the tax revenue for 1920 exceeds the estimates up to the present. For the first nine months of 1920, the yield of consumption taxes, of registration taxes (which includes inheritance taxes), of the stamp taxes, of the state monopolies, and of the tax on personal property (including the tax on the income

from such property) has exceeded the estimates by 1,855 millions and the returns for the same period of 1919 by 2,619 millions. That favorable situation cannot be held if the revenue from tax on the volume of commercial transactions does not increase considerably. In truth, because of that error the tax revenue *for September, 1920 alone* is 322 millions less than the budget estimates tho 448 millions higher than the *revenue of September, 1919*. The revenue returns for October, 1920 shows these fears to be well grounded; the tax on the volume of commercial transactions yielded, in that month, 225 million francs less than the estimated yield. The average monthly deficit yield of that tax as compared with the estimates is thus more than 210 millions.

V. The Outlook

Because of the new fiscal legislation of 1920, the budget deficit is reduced, but no genuine balance has been established. That is a long way off; as to the debt, it keeps piling up.

On the other hand the position of the French tax payer is greatly changed. Up to 1920 he was handled with consideration. During the war and after the armistice, his tax burden was lighter than in the other belligerent countries (than England especially). In 1920, the French tax payer has suddenly felt a great load put upon his shoulders. To the weight of the state taxes must be added that of the local taxes besides, which has also grown considerably in some communes, especially in the large cities. This double weight is not only felt in the many billions the tax payer must give to the public treasury, in one form or another. It is felt also in the exceptional rise in the cost of living which,

in a large measure, is caused by the heavy consumption taxes imposed under the recent legislation.

It is extremely difficult to tell exactly what is the load carried by the tax payers in different countries or to make a comparison between them, which is based on dependable information. The Chancellor of the Exchequer, Mr. Austen Chamberlain, has, however, recently presented a document to the House of Commons in which that comparison is made. In order to measure its value you would have to know how it was drawn up. I doubt whether it can be considered other than merely indicating *the general trend* of the increase of the tax burden of the various countries compared. Indeed, in one respect, it is not exact, for no one knows at the present moment what will be the actual yield of the

Average annual tax contributions per head	Fiscal year to	Taxes per head	Taxes	
			At par	At current rates of exchange
1. Great Britain	Mar. 31, 1914	£ 3 10 10		
	Mar. 31, 1920	21 6 4		
	Mar. 31, 1921	22 0 6		
2. United States	June 30, 1914	$6.79	£ 1 8 0	£ 1 14 0
	June 30, 1919	37.93	7 15 8	9 9 7
	June 30, 1920	49.41	10 3 0	12 7 0
3. France.....	Dec. 31, 1913	103.40 fr.	4 2 0	2 4 0
	Dec. 31, 1919	209.60	8 6 4	4 9 3
	Dec. 31, 1920	450	17 16 10	9 11 6
4. Italy.....	June 30, 1914	33.90 li.	1 6 4	0 10 4
	June 30, 1919	134.30	5 6 6	2 2 0
5. Germany.....	Mar. 31, 1914	31.30 m.	1 10 8	0 4 4
	Mar. 31, 1920	444.20	21 15 8	3 1 0

taxes established by the laws of June 25 and July 31, 1920. The estimates made in June and July, 1920 have not been confirmed by the outcome, which falls far short. Again, the English document does not deal with the local taxes. And finally and most important, the weight of the tax burden depends mainly upon the *capacity to pay*. The different economic positions of different countries at the present time can be subjected to a common measure only with difficulty. These reservations must be borne in mind when considering the figures.

Has the French tax payer reached the end of his troubles? The answer depends mainly upon the solution made of the four following problems.

First, the reduction of expenditure, particularly of military expenditure.

Second, the settlement of the foreign debt.

Third, the settlement of the reparation payments by Germany.

Fourth, the stabilizing of foreign exchange.

1. As regards reduction of military expenditure. The nationalist wave which rolled over all the belligerent countries did not spare France. On the morrow of the war which was to have been the last of all wars in all countries a very strong resistance against a reduction of military expenditure can be observed. In England and the United States it is naval expenditure that is extended; in France it is the expenditure upon land forces. The naval policies of England and of the United States appeared, in France, unjustified. The French military policy has an excuse; the indisputable resistance of Germany to the execution of the treaty of Versailles. Besides many in France criticize that military policy.

However that may be, the figures of the projected budget of the Minister of War for the financial year of 1921 is as follows (in francs):

Ordinary budget	3,299,324,000
Extraordinary budget	2,597,986,000
Budget of recoverable expenses	14,500,000
Expenses of occupation	635,064,000
Budget for ammunition	133,326,000
Making a round total of	6,680,200,000

In the extraordinary budget the Morocco expenses account for 591 millions. This budget includes besides the expenditure incurred in connection with Syria, Poland, and South Russia.

The figures for the same budget for 1920 were as follows:

Ordinary budget (including 391 millions expenditure for Morocco)	2,586,315,000
Extraordinary expenditure	1,649,000,000
Recoverable expenditure	12,500,000
Expenses of occupation	705,000,000
Budget for ammunition	198,000,000
Giving a total	5,150,815,000

The war budget for 1921 thus shows an increase of nearly 1,530 millions over that for 1920.

The general total of troops, as stated in the budgets of 1921 is over 38,473 officers and 696,000 men. To this number must be added 800 officers on detached duty in connection with other ministries, and 30,000 men employed in projects of one sort or another. Furthermore one must reckon the 201,246 horses. The enormity of the military expenditure is evident. Finally, the Minister of War has recently secured the passage by the Council of Ministers of an act fixing the term of military service at 18 months. The Minister of War wanted a two year term. It is generally understood that under the law the period of service will be 18 months, but that it may be extended to two years in case of necessity, without need of asking parliamentary authorization for the same.

Will these military measures be passed? There will be strong opposition.

The Minister of Finance has tried to oppose this increase of military expenditure. He made (in October, 1920) an appeal to the high authority of the President of the Republic which stirred up the constitutional question of the powers of the Minister of Finance and the presidential powers. It would appear, however, that this step had no success for in an official note, dated October 15, 1920, it was made known that "the Minister of Finance has received and at once sent on to the Finance Committee of the Chamber of Deputies the figures of the 1921 budget of the Minister of War." It would appear that the Minister of Finance exercised no control and therefore that the President has not desired to step in or has not succeeded in his intervention.

The Finance Committee of the Chamber of Deputies has also expressed an opinion in favor of a restrictive policy (Resolution of the Committee, Oct. 11, 1920). It is, however, difficult to tell whether a majority of the Chamber agrees. The country suffered so sadly from the German invasion and barbarity that the specter of Germany need only be waved before a French Chamber in order to involve it in military expenditures. The genuine disarmament of Germany alone can bring about a change in that mental state, and, as a consequence, a change in military expenditure. Having escaped from a deadly peril, the immense majority of Frenchmen absolutely do not believe in the resignation of Germany; they are firmly convinced that Germany will seize the first opportunity to seek revenge. And once again it will be a question of life and death. Under these conditions, Frenchmen are ready to agree to all pecuniary sacrifices asked of them rather than suffer another invasion. These are feelings which peoples less

tried by war, like the English and Americans, do not understand. Certain English and American public men talk freely of French imperialism. Since 1870 the French people have had a horror of war, but a still greater horror of invasion. Yet it does not do to forget that there are in France some impenitent imperialists. It must be admitted that the stirring up of the just passion for national defense makes an excellent platform for the imperialists, jingoes, and militarists. For all these reasons the question of the military expenditure in France remains one of the most difficult to solve satisfactorily. It is a good sign that because of the opposition of the Finance Committee to the policy of military organization drawn up by the Minister of Finance, he resigned (December, 1920). He was replaced by Raiberti, president of the Finance Committee of the Chamber of Deputies, who was chosen to give effect to the ideas of the Commission. One may hope to see the imperialist projects upheld by Mr. A. Lepage and Mr. Barthou come to nought.

2. France has received from the English and American governments loans totaling (at par of exchange) 26,755 million francs:

From the American treasury	12,327
From the British treasury	14,428

For the present it is understood that the English and American governments do not ask payments either of interest or of capital. The question is in abeyance.

Here I must speak frankly. During the war it was proclaimed, with numerous repetitions, that the Allies were pooling all their resources for the common victory. France, the least wealthy of the three Allies and the most tried by the war, received financial help which, it must be stated with emphasis, powerfully helped the

Allies to win the war. The *unanimous* opinion of Frenchmen is that the unexampled sacrifices of human life; the destruction of all kinds inflicted upon the invaded regions; the complete stoppage during the four years of war of economic production, which was entirely devoted to the war; the heavy tribute paid by France to foreign ship-owners, especially to the English — these fully make up for the money advances made to her. The *unanimous* opinion of Frenchmen is that to compel France to pay that foreign debt would not only impose an unbearable burden upon her, but also to perpetrate a serious injustice. The victory was won by the common effort of the Allies; the benefits and the sacrifices also must be shared in common.

Besides, it would be a grave mistake of policy to permit this germ of discord to flourish in the relations between the United States, England, and France — the question of the repayment of loans. Upon this matter French opinion is altogether in agreement with Professor Keynes of England. If the claims of the Allies against each other, arising out of war loans, are not plainly and simply abandoned, and if Germany only pays part of her obligations, the result of the war will have been to make certain of the Allies pay a heavy indemnity instead of being paid. Such a burden would be all the more bitterly resented because it would be thought wholly unjust. The financial and political consequences of such payments as these cannot be calculated.

Indeed, the experts do not overlook the extent of the sacrifice which England and, above all, the United States would be called upon to make, if a policy of mutual abandonment of debts be adopted. They know that the English and American tax payer have not been treated tenderly, and still have heavy taxes to meet. They

do not disregard the fact that the people in these countries, now that victory is won, regard with disfavor the abandonment of claims, which means that their own tax load will be heavy. They are aware, finally, of the fact that English and American public opinion has been unfavorably impressed by the fact that the French tax payer was not called upon during the war to submit to as heavy taxation as English and American citizens.

But these considerations no matter how strong, may not prove decisive. The plain facts remain: the frightful sacrifices borne by France in men and devastated territory, the ruin of the national economic system because of the war, the great profits made during the war by English and American industry and commerce, of which a (not negligible) part was paid by the French treasury.

The contention that the French tax payer was carrying a relatively light tax burden has now no apparent weight, and justly it never had any. In fact, the question of when and how the French tax payer will pay the costs of the war is a matter of domestic policy, which does not affect the question of the just distribution among the Allies of the costs of the war.

3. The treaty of Versailles imposed upon Germany the whole payment for the damage that the German troops caused in France. The great difficulties are firstly, to fix the amount and secondly, to secure the payment.

Opinion is divided in France upon the fixing of the amount. Some have reconciled themselves to the determination of a lump sum, fixed once for all, in order to facilitate payment and with the idea that "a bird in the hand is worth two in the bush." Others demand the entire payment, whatever the sum may be, as reckoned in conformity with the treaty of Versailles. This latter view appears to be the more strongly supported, and it

is this view, at all events, which has prompted the government policy up to the present (October, 1920).

The idea of a fixed amount, supported by England is — it would be silly to deny it — a constant cause of friction between the English and French governments. It is because the two governments have not been able to come to an understanding on this point that the Financial Conference at Brussels in September–October, 1920 turned out to be only an academic gathering, without any serious usefulness. It is impossible to say at the present time how the matter will be settled. The settlement of the question, however, cannot long be delayed. Beginning with the first half of 1921 it should be squared with the terms of the treaty of Versailles.

The great question of payment by Germany remains. How will she make the payment? Will England and especially the United States lend their financial assistance? Will they discount in whole, or in part, the claims of France against Germany? The economic and financial recovery of France is bound up with the answers of these questions. Public opinion cherishes some optimistic and favorable hopes in the matter. The experts fear the spirit of national selfishness which, since the armistice, has steadily flourished.

4. It is equally difficult to make predictions on the subject of the extension of international credits to the various countries of Continental Europe and especially France. Without these international credits trade becomes difficult, and financial and economic recovery is put off for an indefinite period. In this matter also, the Brussels Conference in September–October, 1920 bore no other fruits than the clear display of a spirit of national selfishness.

To conclude: the financial and economic future of France is gloomy. But the vigor of the French people is

great, as their history shows; and their spirit of economy and thrift is traditional. In spite of the enormous difficulties which seem to stand in the way of her recovery, the French nation will come out of the terrible trials she has experienced, triumphant. That triumph, no doubt, will be a matter of many long years.

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GENERATING CYCLES OF PRODUCTS AND PRICES

SUMMARY

The major features of economic cycles are traceable to three primary laws: (1) the law of the generating cycle of raw materials, which is due to a non-economic cause; (2) the law of demand for raw materials, in consequence of which the generating cycle of products originates a derived cycle of prices for raw materials; and (3) the law of competitive price, according to which the prices of finished goods in an open market tend to correspond with the cost of production.

Correlation of crop yields and crop prices, 218. — Generating cycles of products, 224. — The derived cycle of prices, 226. — Cycles in the products of mines, 228. — Cycles in raw materials, 231. — Concluding observations, 233.

A TELLING advance was made in the theory of economic dynamics when crises were proved to be phases of economic cycles. The spectacular features of crises — panics, bankruptcies, collapse of prices, unemployment of labor, and subsequent general depression of business — had for some time attracted attention and elicited innumerable theories as to their cause. A general characteristic of these theories was the citing of detached, non-recurring events as the separate cause of each isolated crisis. A war, a failure of some conspicuous establishment, an election, or a bad harvest were among the supposed causes. With the development of the theory of cycles the well-marked stages of prosperity, crisis, decline, and depression were described and shown to be parts of a general rhythm of industry. This more ample view of the vicissitudes of business suggested that if the rhythm as a whole could be traced to a single cause, the foundation would be laid for long-range forecasting and would, perhaps, lead to the con-

trol of economic changes in the interest of the social good.

The buoyant, expectant hope which stimulated the early searchers for a single, persistent cause of cycles is shared by few recent investigators. On the contrary, there is flat denial of the existence of any marked regularity or periodicity in the phenomena; attempts at explanation by means of a few causes are regarded as obsolete; and while recognition is made of the existence of the cycle with its separate phases, there is, in many cases, a reversion to the method of alleging isolated, separate explanations for each critical point in the several phases. The present inquiry takes up the abandoned search for a single explanation of the entire rhythm and its constituent parts.

Two accomplished investigators, Professor Aftalion,[1] and Professor Bresciani-Turroni,[2] have pointed out that the average length of cycles, since 1857, has been in the neighborhood of eight years. That fact is sufficient reason for asking why cycles are, on the average, about eight years in length, and whether this loose periodicity may not have as its origin a periodically recurring cause. Professor Mitchell, in his masterly *Business Cycles*, has set in relief another fact of critical significance, namely, the supreme importance in each phase of the cycle of the volume and prices of raw materials. In his description of "How Prosperity Breeds a Crisis" he has made an illuminating statement which is here quoted at length. I have taken the liberty of italicizing several sentences:

> . . . The cost of materials exceeds wages in every one of the leading branches of manufacture, and in a majority of cases is over twice

[1] Albert Aftalion, Les Crises périodiques de surproduction, vol. i, p. v, vol. ii, pp. 32, 33, and *passim*.

[2] Costantino Bresciani-Turroni, Le Variazioni cicliche dei prezzi, p. 57.

as large. Indeed, on the average it makes practically two-thirds of the total outlay. If wares for re-sale be substituted for materials, this proportion must run far higher in wholesale stores, while in retail shops it cannot be much lower than in factories on the average and may well be considerably higher. Even the transportation companies and enterprises in the extractive industries have to buy vast quantities of current supplies. Hence an increase in the cost of materials, wares, or supplies is often an increase in the largest single item of expense, and always an increase in an important item. The relative fluctuations in the prices of those commodities which are bought and of those which are sold are therefore of great, in many cases of decisive, importance in determining profits.

Concerning these relative fluctuations, our definite information consists of index-numbers for raw materials, partially manufactured products, and finished goods; also for the same commodities at wholesale and at retail. Now this statistical evidence points to the conclusion that what must be taken as buying prices creep up on selling prices during a period of prosperity. Of course this movement . . . threatens a reduction of profits.

While a difficulty of this character seems to be encountered in most branches of business it is likely to become peculiarly acute in those manufacturing industries which use animal and farm products as their leading raw materials. For, following up a suggestion of Sombart's, we have found that these classes of products are more erratic in their price fluctuations than are the products of mines and forests. Hence an uncommonly large speculative risk must be borne, or insured against, in such branches of trade as meat packing, flour milling, cotton spinning, woollen weaving, tanning, etc. Of course this risk exists during all phases of the business cycle, but it is augmented in prosperity by the necessity of carrying larger stocks of raw materials. *The census indicates that more than three-fourths of all the "materials purchased in the raw state" by American factories in 1900 belonged to this class which is peculiarly unstable in price.*[1]

[1] W. C. Mitchell, Business Cycles, pp. 481, 482. To the above statement Professor Mitchell appends the following note, p. 482, note 10.

"The sources of raw materials are given as follows:

From farms	$1,941,000,000
" forests	119,000,000
" mines	320,000,000
" the sea	10,000,000
" all sources	$2,490,000,000

Twelfth Census of the United States, Manufactures, Part I, p. cxxxv."

There is a slight error in the above value "from all sources." The aggregate sum is $2,390,000,000, and this would make the proportion contributed by the farms 81.2 per cent.

Now may it not be that the physical yield of the farms, which supplied more than three-fourths of all the raw materials of American factories in 1900, is itself a periodically varying magnitude that will produce a corresponding rhythm in the prices of raw materials and the prices of products derived therefrom? Is it not possible that this same periodicity may be of such length as to approximate the average length of cycles which has been noted by Professor Aftalion and Professor Bresciani-Turroni?

If we discover this periodicity in the yield of farm products, we shall make a distinction between generating economic cycles and derived economic cycles. Generating economic cycles will then be economic cycles which have their origin in non-economic causes and are themselves the originating source of derived economic cycles. If the varying yield of the crops has its origin in a periodic meteorological cause, it will itself be periodic and will generate periodic sequences in the whole of the dependent economic changes. If the existence of such a generating cycle is established, there will be no need, in treating the phases of economic cycles, to seek separate explanations for their existence. The phases of the generating cycles will themselves originate corresponding phases in the dependent, derived cycles.

The Correlation of Crop Yields and Crop Prices

From the point of view of the value of the product, our crops ranked, in 1919, in the following order: corn, wheat, cotton, hay, oats, potatoes. These six crops, in 1919, contributed 70.8 per cent of the value of the multitudinous crops produced by our farms. The aggregate

value of all the crops produced in 1919 was, according to the estimate [1] of the Secretary of Agriculture, $15,873,000,000, and of this aggregate amount the above six products contributed $11,238,536,000. The records of the yields and prices of these six crops from 1882 give the statistical material of which use is made in the subsequent investigation.

As the American production in case of all six of these commodities is only a part of the world supply, our first inquiry will be whether, notwithstanding this fact, the domestic prices are immediately related to the domestic yield. Furthermore, as we wish to eliminate the varying factor of changing acreage, our inquiry will take the form of ascertaining whether the domestic prices of these several crops are immediately related to the respective yields per acre.

In order to secure a certain degree of comparability in the graphs, the raw figures [2] of yield and the corresponding December farm price were, for each crop, converted into index numbers in which the average yield and the average price for the years 1890–99 were taken as the respective bases. The graphs of these index numbers of yield and prices are given in Figures 1, 2, 3. In each of the six graphs of yield and the six graphs of prices the statistics show a secular trend which must be ascertained as a preliminary to the work of finding the relation between the variations in yield and the variations in prices. In each of the twelve curves the secular trend was obtained by fitting a curve of the type $y = a + bx + cx^2 + dx^3$ to the data, and the resulting equations were found to be those that are given in the descriptions of Figures 1, 2, and 3. The origins of the equations are different in the two graphs, because the

[1] Yearbook of the Department of Agriculture, 1919, p. 17.

[2] The raw figures of yield per acre and December farm prices were taken from the Yearbooks of the Department of Agriculture.

crops are taken from 1880 to 1918, and the prices, owing to the abnormal fluctuations during the war, only from 1880 to 1914.

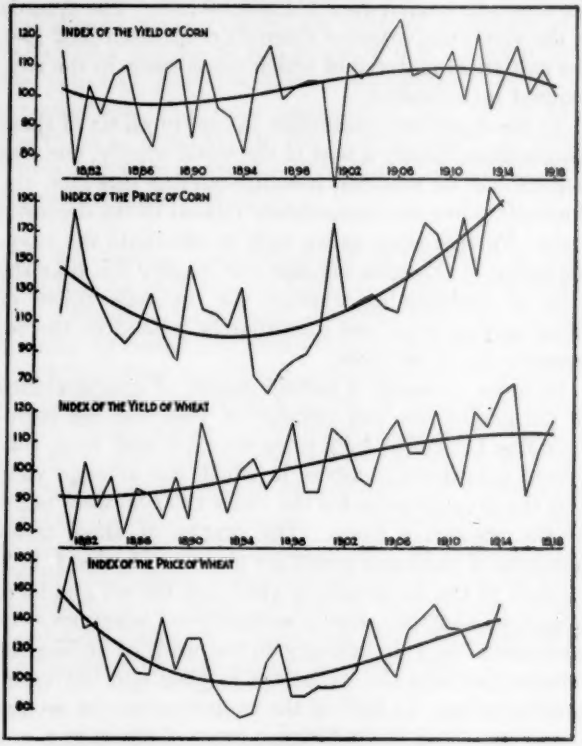

FIGURE 1

Secular trends in the index numbers of the yield and price of corn and wheat.

Corn: Yield, $y = 103.9 + .838x - .0032x^3 - .002,233x^3$, origin at 1899;
Price, $y = 102.4 + 1.690x + .2275x^2 - .001,288x^3$, origin at 1897.

Wheat: Yield, $y = 102.1 + .952x - .0004x^2 - .001,101x^3$, origin at 1899;
Price, $y = 99.2 + 1.057x + .1780x^2 - .005,570x^3$, origin at 1897.

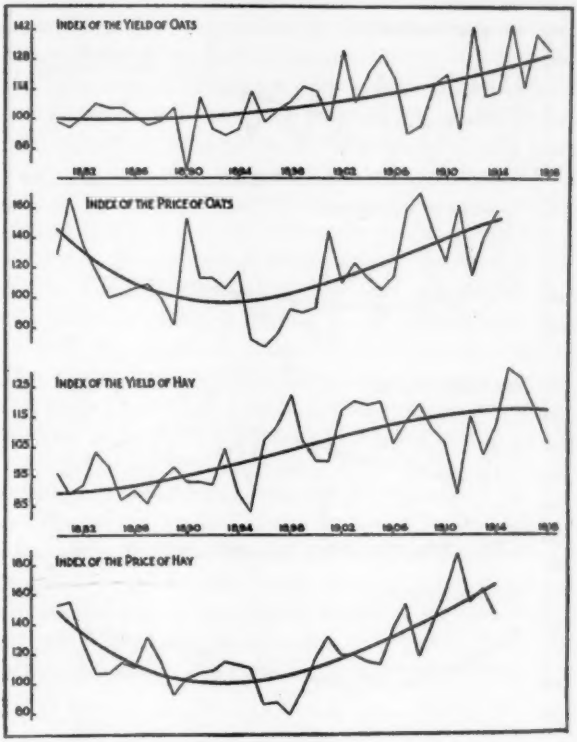

FIGURE 2

Secular trends in the index numbers of the yield and price of oats and hay.

Oats: Yield, $y = 105.7 + .805x + .0258x^2 - .000{,}038x^3$, origin at 1899;
Price, $y = 100.6 + 1.700x + .1692x^2 - .005{,}271x^3$, origin at 1897.

Hay: Yield, $y = 104.9 + 1.156x - .0049x^2 - .001{,}816x^3$, origin at 1899;
Price, $y = 103.1 + 1.696x + .1882x^2 - .004{,}042x^3$, origin at 1897.

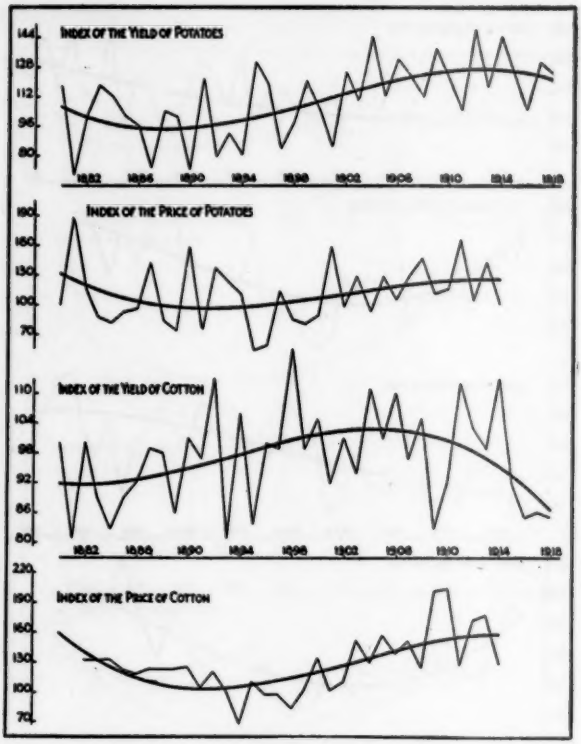

FIGURE 3

Secular trends in the index numbers of the yield and price of potatoes and cotton.

Potatoes: Yield, $y = 108.2 + 1.992x + .0179x^2 - .004{,}435x^3$, origin at 1899;
Price, $y = 101.6 + 1.612x + .0921x^2 - .006{,}101x^3$, origin at 1897.
Cotton: Yield, $y = 101.2 + .548x - .0331x^2 - .001{,}901x^3$, origin at 1899;
Price, $y = 111.0 + 2.688x + .1667x^2 - .009{,}536x^3$, origin at 1897.

The next step in the inquiry is to determine whether the percentage variations of the yields of the several crops from their respective secular trends are related to the corresponding percentage variations of prices from the respective secular trends of prices. The method of investigation will be made clearer by an illustration. The equation descriptive of the secular trend in the yield of corn was found to be $y = 103.9 + .838x - .0032x^2 - .002{,}233x^3$ with origin at 1899. The graph of this equation is the smooth curve in the upper part of Figure 1. The equation descriptive of the secular trend of the December farm price of corn was found to be $y = 102.4 + 1.690x + .2275x^2 - .001{,}288x^3$, with origin at 1897, the graph of which is also given in Figure 1. The percentage deviations from the secular trend of the actual yield per acre for the separate years from 1880 to 1914 were computed, and these percentage deviations were then correlated with the corresponding percentage deviations of the actual prices from the price secular trend. Table I in the Appendix, which refers to corn, gives an illustration of the computations. Similar calculations were made for the remaining five crops, and the coefficients of correlation between the corresponding percentage deviations, for the years 1880–1914, were computed. The resulting coefficients were these:

Corn	$r = -.78$
Wheat	$r = -.23$
Cotton	$r = -.45$
Hay	$r = -.68$
Oats	$r = -.67$
Potatoes	$r = -.90$

Notwithstanding the fact that the American production of these crops is only a part of the world supply, there is an inverse relation between the percentage deviations of the yield per acre of our crops and the percentage deviations of the corresponding prices.

Generating Cycles of Products

We have just established that there is an inverse relation between the yield per acre of each of the six representative crops and their respective prices. If now we can show that the combined yield of the crops is periodic, there will be excellent reason for believing that their combined prices will be periodic and that the prices of commodities produced from farm materials will tend to show the same well-defined rhythm. Our immediate problem, therefore, is to discover whether there is a periodic cycle in the combined yield of the six representative crops.

To go forward with the work we needed to compute an index number of the combined yield of the representative crops. In treating the preceding question as to the correlation of the yield of the several crops with their respective prices, we computed, in each case, the percentage deviations of the yield per acre from the secular trend. For our present purpose of finding whether the combined yield of the six crops tends to run in cycles, the percentage deviations of the yield of the several crops for each year of the record, from 1882 to 1918, were added. The resulting figures, which are given in Table II of the Appendix, constitute our index numbers of the yield per acre of the six crops

In the attempt to learn whether, during the interval under investigation, the yield of the crops was cyclical and periodic, the periodogram of the yield was computed and the graph was drawn. The results of the computation are given in Table III of the Appendix, and the graph appears at the top of Figure 4. The periodograph shows that if there is a periodicity between three and twelve years in the data, its most prob-

able length is in the neighborhood of eight years. When the probable period of eight years is computed, its maxima are found to occur, approximately, at 1882, 1890, 1898, 1906, 1914. The graph of the eight-year cycle is given in the lower part of Figure 5. This outcome of the calculations is gratifying because of its consonance with results that have already been obtained.

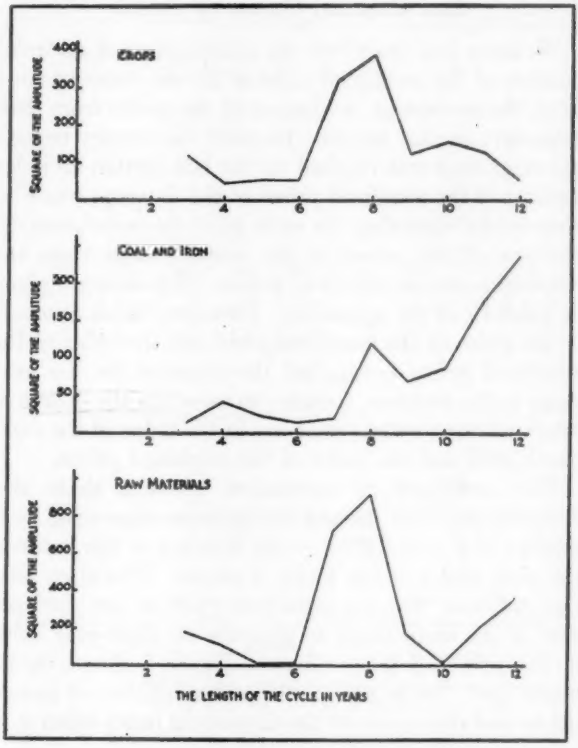

FIGURE 4
Periodographs of crops, coal and iron, and raw materials of manufacture.

Other investigations [1] have shown that there are eight-year cycles with maxima approximately at 1882, 1890, 1898, 1906, 1914 in the annual rainfall of the Ohio Valley, the May and June rainfall of the Dakotas, and in the yield of wheat, oats, and barley in the Dakotas, the United States, the United Kingdom, and France.

The Derived Cycle of Prices

We have just described the construction of an index number of the combined yield of the six crops by summing the percentage deviations of the yields from their respective secular trends. To carry the inquiry beyond the stage that was reached in the last section an index number of the combined prices of the six crops was constructed by summing, for each year, the percentage deviations of the prices of the several crops from the respective secular trends of prices. The data are given in Table IV of the Appendix. These two index numbers — the index of the combined yield and the index of the combined prices — supplied the material for the next stage in the problem, namely, to ascertain the degree of relation between the variations in the index of the combined yield and the index of the combined prices.

The coefficient of correlation between these two variables is $r = -.69$, and the equation expressing their relation is $y = -1.295x - .02$, where x = the index of the yield and y = the index of prices. This close relation indicates that the eight-year cycle in the yield per acre of the crops tends to generate an eight-year cycle in the prices of the products. Figure 5 shows, in its upper half, the course of the index number of actual prices and the course of the theoretical index when $y =$

[1] "Forecasting the Crops of the Dakotas," Political Science Quarterly, June, 1919, pp. 228, 229. "Crop Cycles in the United Kingdom and in the United States," Journal of the Royal Statistical Society, May, 1919. "Crop Cycles in the United Kingdom and in France," ibid., May, 1920.

$-1.295x - .02$ is used as a forecasting formula. The lower half of Figure 5 shows the generating eight-year cycle in the yield per acre of the crops and the derived eight-year cycle in the prices of the crops. The equation of the generating cycle of products was obtained in the preceding section. The derived cycle of prices was computed from the generating cycle of products by

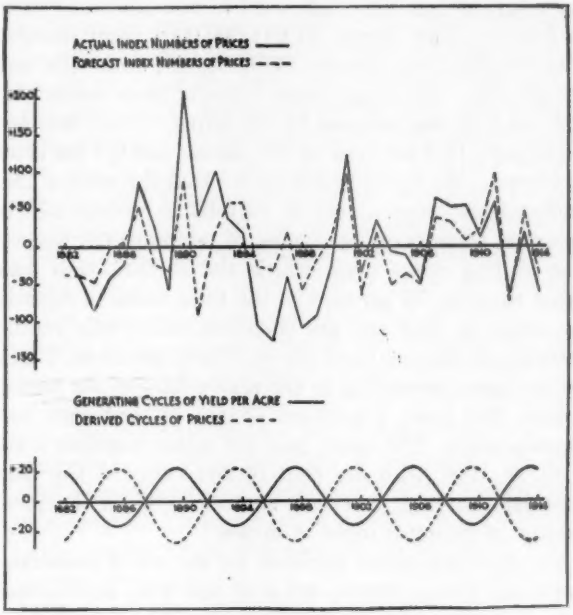

FIGURE 5

Upper part: Actual index numbers of prices of the six representative crops and the index numbers of prices forecast from the index numbers of the yield per acre by means of the formula

$$y = -1.295x - .02.$$

Lower part: Generating cycles of the yield per acre of the crops,

$$y = 1.6 + 20.0 \sin (45°t + 109°),$$ origin at 1882;

Derived cycles of prices of the crops computed from the generating cycles of yield by means of the formula,

$$y = -1.295x - .02.$$

means of the formula connecting the variations of the combined yield with the variations of the combined prices. ($y = -1.295x - .02$.)

Cycles in the Products of Mines

We have noted that according to the census of 1900, the values of raw materials used in manufactures were as follows: from farms, $1,941,000,000; from forests, $119,000,000; from mines $320,000,000; from the sea $10,000,000. Of the aggregate value of these materials, 81.2 per cent was supplied by the farms; 5.0 per cent by the forests; 13.4 per cent by the mines; and 0.4 per cent by the sea. We have already shown that the yield of the leading farm crops moves in well-defined cycles which generate corresponding cycles of agricultural prices. The leading crops upon which the computation was based supplied 70 per cent of the total value of American crops in 1919 and are therefore sufficiently representative of the yield and prices of farm products. Next to the farms, according to the above figures, the mines furnish the most important source of materials for manufactures. The farms and the mines together supplied, in 1900, 94.6 per cent of the value of the raw materials used in American factories. Does the production of minerals move in cycles?

The most important minerals for the use of manufactures and transportation are coal and iron, and in our further inquiry these two minerals will be regarded as being representative of the products of the mines just as the six crops — corn, wheat, oats, hay, cotton, and potatoes — were treated as being representative of the products of the farm.

In preparing the statistics of the production of coal and pig iron with a view to ascertaining whether there is

any periodicity in their production, the procedure was similar to that which was followed in the case of the yield of the crops. The raw figures [1] of production were first reduced to index numbers in which the mean production for 1890–99 was placed as equal to 100. The graphs of the index numbers of production are given in Figure 6. Because of the enormous and irregular increase in the production of both coal and iron in the interval under investigation, 1881–1913, the description of the secular trends by means of single equations requires the use of a slightly more complex curve than the one employed in the treatment of the yield and prices of farm products. In the latter case a parabola of the type $y = a + bx + cx^2 + dx^3$ was found to give a satisfactory fit. But in the description of the secular trends in the production of coal and iron an additional term was added to the above equation, and a parabola of the fourth order $y = a + bx + cx^2 + dx^3 + ex^4$ was fitted to the data. The graphs in Figure 6 show the secular trend of both coal and iron, and the corresponding equations are given in the legend descriptive of Figure 6.

After the secular trend of coal and the secular trend of iron were ascertained, the percentage deviations of the production of each commodity in the years from 1882–1913 were computed. These percentage deviations were then combined into an index number of the deviations in the production of coal and iron by summing the percentage deviations for each year. The data are given in Table V of the Appendix. Because of the abnormal demand for coal and iron during the war the figures were not extended beyond 1913.

If now the index numbers of the deviations in the production of coal and iron from 1882 to 1913 are scru-

[1] The figures were taken from the Statistical Abstract of the United States, 1915, pp. 689, 690.

tinized with a view to discovering periodicities, we find that the periodograph takes the shape that is pictured in the second curve in Figure 4. The data are given in Table III of the Appendix.

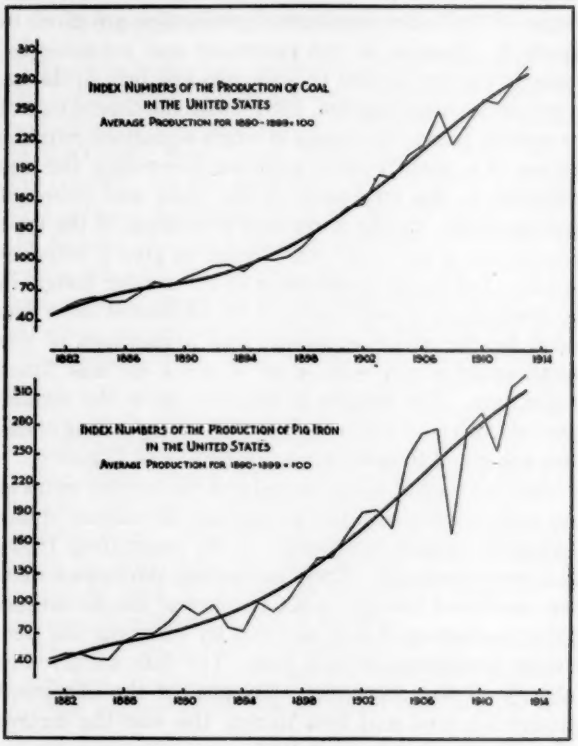

FIGURE 6

Secular trends in the index numbers of the production of coal and pig iron in the United States.

Coal: $y = 114.1 + 7.777x + .4131x^2 - .000{,}751x^3 - .000{,}8141x^4$, origin at 1897;

Pig Iron: $y = 119.4 + 9.199x + .4110x^2 - .002{,}561x^3 - .000{,}7239x^4$, origin at 1897.

It is obvious from the periodograph that if there are real cycles in the production of coal and iron, the most probable are in the neighborhood of eight and eleven or twelve years in length, but in the present paper we shall confine the discussion to the eight-year cycle. When the equation to the eight-year cycle is computed, the maxima are found to occur approximately at 1882, 1890, 1898, 1906, 1914. And if the eight-year cycle in the production of coal and iron is graphed and compared with the graph of the eight-year cycle in the yield of the crops, the coal and iron curve is found to lag about three-tenths of a year behind the curve for the crop yield. The graphs are given at the top of Figure 7.

Cycles in the Production of the Raw Materials of Manufacture

The production of the farms and the mines taken separately tends to run in eight-year cycles, the cycles of the raw materials from the mines inclining to lag a few months behind the cycles in the yield of the crops. The farms and the mines together supplied, in 1900, 95 per cent of the raw materials of American factories, and, consequently, their joint production affords both an adequate measure of the changes in the volume of raw materials and a valuable index of the changes in the physical volume of trade. Is there any regularity in the joint production of the farms and the mines?

In the same manner in which we constructed an index number of the yield of the crops and an index number of the production of coal and iron, we made an index number of the raw materials of manufacture. The percentage deviations of the yield of the crops and the percentage deviations of the production of coal and iron were summed, and the aggregate percentage deviations

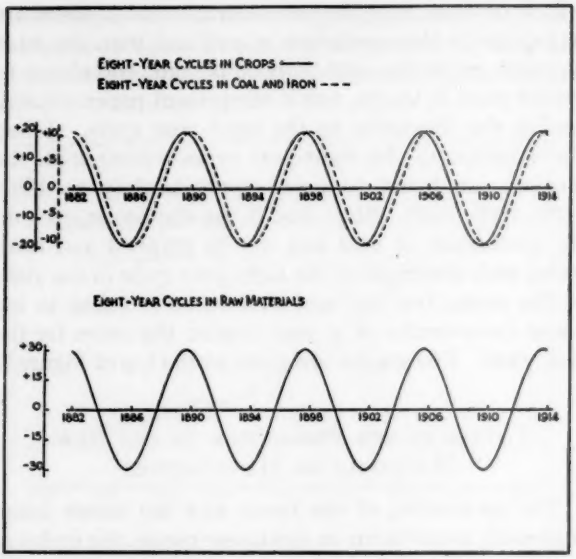

FIGURE 7

Cycles in the yield of the crops, the production of coal and iron, and the production of the raw materials of manufacture.

Crops: $y = 20.0 \sin (45°t + 109°)$, origin at 1882;
Coal and Iron: $y = 11.0 \sin (45°t + 93°)$, origin at 1882;
Raw Materials: $y = 30.3 \sin (45°t + 103°)$, origin at 1882.

were regarded as the index numbers of the production of raw materials. The data are given in Tables II and V of the Appendix.

When the index numbers of raw materials from 1882 to 1913 were scrutinized for the purpose of discovering periodicities, it was found that the periodograph took the shape of the bottom curve in Figure 4, showing that if there is a cycle in the production of raw materials of manufacture in the United States, its probable length is about eight years. The computations referring to the periodograph are given in Table III of the Appendix. If

the eight-year cycle in the production of the raw materials of manufacture is computed, its maxima will occur, approximately, at 1882, 1890, 1898, 1906, 1914, and the graph of the cycle will run in the manner described in the bottom curve of Figure 7.

There are two observations with regard to the theory of economic cycles that need to be emphasized by frequent repetition. The first was made by Professor Aftalion, the second by Rodbertus.

After estimating the average length of cycles since 1857 at approximately eight years, Professor Aftalion stated that the essential problem in the theory of economic cycles is to discover the cause of the rhythm. "L'observation du rythme de la production générale fait . . .seulement comprendre la *survenance* d'une hausse, puis d'une baisse générale des prix, l'existence d'un rythme. Elle ne nous donne pas l'explication de la *durée* de cette hausse ni de cette baisse, de la durée des phases du rythme." [1]

In one of the briefer essays of Rodbertus, "Physiokratie und Anthropokratie," [2] the initiator of the socialist theory of business cycles stresses the importance of discovering the natural cause of the economic rhythm in order that society may set about adjusting itself in the light of the acquired knowledge. He draws the distinction between the rule of nature — Physiokratie — and the rule of man — Anthropokratie. Quesnay and Adam Smith and their followers, according to Rodbertus, regarded the problems of social science primarily from the point of view of physical science and were led to the maxim "*laissez aller et laissez passer; le monde va de lui-même.*" By contrast Rodbertus would empha-

[1] Albert Aftalion, Les Crises périodiques de surproduction, vol. ii, pp. 41, 42.

[2] Rodbertus-Jagetzow, Briefe und Socialpolitische Aufsätze.

size the great possibilities of social progress through the intervention of the state and the utilization of natural laws for social purposes. With regard to the specific problem of economic cycles, the natural law and cause of the rhythm must be discovered and then utilized by society for its own ends. "Sich im Staatsleben Naturgesetzen zu unterwerfen, heisst, sich des 'Göttlichen' im Menschen begeben, heisst, von socialen Organismen, muthwillig in Krankheit und Tod gehen.

Nach ewigen, eh'rnen
Grossen Gesetzen
Müssen wir Alle
Uns'res Daseins
Kreise vollenden.
Nur allein der Mensch
Vermag das Unmögliche;
Er unterscheidet,
Wählet und richtet;
. . . . . .
Er allein darf
. . . . . .
Alles Irrende, Schweifende
Nützlich verbinden."

Goethe: *Das Göttliche.*

HENRY LUDWELL MOORE.

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APPENDIX

TABLE I. — CORRELATION OF THE PERCENTAGE DEVIATIONS OF THE PRICE OF CORN WITH THE PERCENTAGE DEVIATIONS OF THE YIELD PER ACRE OF CORN

Year	Index number of the yield of corn	General trend of the yield of corn	Percentage deviation from the trend	Index number of the price of corn	General trend of the price of corn	Percentage deviation from the trend
1880	114	102	+11.8	115	146	−21.2
1881	77	101	−23.8	184	139	+32.4
1882	102	100	+ 2.0	141	133	+ 6.0
1883	94	99	− 5.1	123	127	− 3.1
1884	107	98	+ 9.2	103	122	−15.6
1885	110	98	+12.2	95	117	−18.8
1886	91	97	− 6.2	106	113	− 6.2
1887	83	97	−14.4	129	110	+17.3
1888	109	97	+12.4	99	107	− 7.5
1889	112	97	+15.5	82	104	−21.2
1890	86	98	−12.2	147	102	+44.1
1891	112	98	+14.3	118	101	+16.8
1892	96	99	− 3.0	114	100	+14.0
1893	93	99	− 6.1	106	99	+ 7.1
1894	80	100	−20.0	132	99	+33.3
1895	109	101	+ 7.9	73	100	−27.0
1896	117	101	+15.8	62	101	−38.6
1897	99	102	− 2.9	76	102	−25.5
1898	103	103	0.0	83	104	−20.2
1899	105	104	+ 1.0	88	107	−17.8
1900	105	105	0.0	103	109	− 5.5
1901	69	106	−34.9	175	113	+54.9
1902	111	106	+ 4.7	117	116	+ 0.9
1903	106	107	− 0.9	123	120	+ 2.5
1904	111	108	+ 2.8	128	125	+ 2.4
1905	120	108	+11.1	119	130	− 8.5
1906	126	109	+15.6	116	135	−14.1
1907	108	109	− 0.9	150	141	+ 6.4
1908	109	110	− 0.9	176	147	+19.7
1909	106	110	− 3.6	168	153	+ 9.8
1910	115	110	+ 4.5	139	160	−13.1
1911	99	110	−10.0	179	167	+ 7.2
1912	121	109	+11.0	141	175	−19.4
1913	96	109	−11.9	200	182	+ 9.1
1914	107	108	− 0.9	187	191	− 2.1

TABLE II. — INDEX NUMBERS OF THE YIELD PER ACRE OF SIX CROPS

Year	Percentage deviations from the respective trends of the index numbers of yield per acre						Combined index number
	Corn	Wheat	Oats	Potatoes	Hay	Cotton	
1882	+ 2.4	+12.9	+ 1.1	+ 1.0	+ 2.9	+ 8.7	+29.0
1883	− 4.7	− 3.7	+ 7.7	+19.2	+14.6	− 3.3	+29.8
1884	+ 9.2	+ 7.8	+ 5.0	+15.5	+ 8.8	− 9.8	+36.5
1885	+12.5	−14.1	+ 5.7	+ 5.2	− 3.8	− 3.3	+ 2.2
1886	− 6.3	+ 2.0	+ 1.1	+ 1.1	− 2.0	− 1.1	− 5.2
1887	−14.1	− 0.9	− 2.9	−22.1	− 7.0	+ 6.4	−40.6
1888	+12.1	− 9.6	− 0.8	+10.6	+ 1.4	+ 4.3	+18.0
1889	+15.0	+ 4.4	+ 4.3	+ 6.3	+ 4.7	− 8.5	+26.2
1890	−12.1	−10.8	−25.0	−23.2	− 2.1	+ 6.3	−66.9
1891	+14.2	+22.0	+ 9.4	+27.1	− 2.9	+ 1.0	+70.8
1892	− 2.7	+ 5.9	− 8.1	−17.5	− 4.9	+17.7	− 9.6
1893	− 5.8	−10.6	−12.3	− 6.1	+ 6.0	−16.5	−45.3
1894	−19.4	+ 2.6	− 8.6	−18.2	−10.1	+ 8.2	−45.5
1895	+ 8.1	+ 5.5	+ 9.8	+29.7	−17.4	−15.2	+20.5
1896	+15.4	− 5.4	− 5.2	+15.5	+ 5.5	+ 1.0	+26.8
1897	− 3.3	+ 1.3	− 0.4	−19.2	+ 8.9	− 1.0	−13.7
1898	− 0.2	+14.5	+ 3.3	− 7.5	+16.8	+17.8	+44.7
1899	+ 1.1	− 8.7	+ 9.1	+12.0	+ 2.0	− 2.0	+13.5
1900	+ 0.3	− 9.6	+ 6.1	− 4.5	− 5.7	+ 2.9	−10.5
1901	−34.4	+ 9.2	− 8.3	−24.1	− 6.7	− 9.8	−74.1
1902	+ 4.6	+ 4.7	+21.6	+ 9.6	+ 8.2	− 1.1	+47.6
1903	− 1.2	− 7.7	− 0.8	− 5.2	+10.0	− 8.7	−13.6
1904	+ 3.3	−11.2	+11.0	+22.0	+ 7.5	+ 7.8	+40.4
1905	+10.3	+ 2.0	+16.5	− 5.8	+ 8.0	− 1.9	+29.1
1906	+15.4	+ 8.3	+ 5.8	+ 9.0	− 6.1	+ 6.8	+39.2
1907	− 1.6	− 2.8	−20.5	+ 0.8	+ 0.1	− 4.9	−28.9
1908	− 0.8	− 3.5	−17.0	− 9.7	+ 4.1	+ 2.9	−24.0
1909	− 3.6	+ 8.3	− 0.6	+10.4	− 3.4	−17.8	− 6.7
1910	+ 4.6	− 5.1	+ 2.6	− 3.2	− 8.0	− 8.9	−18.0
1911	− 9.5	−15.1	−21.8	−17.3	−23.2	+12.0	−74.9
1912	+10.9	+ 7.6	+18.5	+16.5	− 1.5	+ 5.1	+57.1
1913	−11.9	+ 2.6	− 8.5	− 7.1	−12.4	+ 2.1	−35.2
1914	− 1.0	+11.7	− 8.1	+13.4	− 4.7	+18.9	+30.2
1915	+ 8.9	+14.3	+15.4	− 0.8	+11.9	− 2.1	+47.6
1916	− 4.8	−18.6	− 9.2	−16.0	+ 9.2	− 6.6	−46.0
1917	+ 4.0	− 5.2	+ 8.9	+ 5.6	+ 0.7	− 3.4	+10.6
1918	− 3.7	+ 4.4	+ 1.6	+ 2.5	− 9.2	− 2.3	− 6.7

TABLE III. — PERIODOGRAMS OF THE INDEX NUMBERS OF THE YIELD PER ACRE OF THE CROPS, THE PRODUCTION OF COAL AND IRON, AND THE PRODUCTION OF THE RAW MATERIALS OF MANUFACTURE

Length of the cycle (years)	Square of the amplitude		
	Crops	Coal and iron	Raw materials
3	148.65	14.12	182.17
4	41.15	42.37	110.64
5	67.18	24.41	5.92
6	65.20	13.13	11.45
7	319.21	21.03	725.32
8	401.24	120.41	919.26
9	123.92	70.41	170.32
10	155.16	87.49	16.42
11	129.95	176.26	211.03
12	54.31	237.70	368.68

TABLE IV. — INDEX NUMBERS OF THE DECEMBER FARM PRICES OF SIX CROPS

Year	Percentage deviations from the respective trends of the index numbers of the December farm prices						Combined index number
	Corn	Wheat	Oats	Potatoes	Hay	Cotton	
1882	+ 6.0	− 4.9	+ 3.1	− 2.5	− 4.5	− 5.7	− 8.5
1883	− 3.1	+ 3.0	− 4.8	−22.8	−15.7	0.0	− 43.4
1884	−15.6	−22.7	−16.0	−25.5	−12.3	+ 6.4	− 85.7
1885	−18.8	− 3.3	− 9.6	−12.3	− 2.6	+ 2.5	− 44.1
1886	− 6.2	−10.3	− 1.8	− 5.8	− 1.8	+ 2.6	− 23.3
1887	+17.3	− 7.1	+ 2.8	+40.6	+20.2	+11.8	+ 85.6
1888	− 7.5	+31.5	− 2.9	−15.2	+ 8.5	+14.9	+ 29.3
1889	−21.2	+ 1.9	−18.8	−24.5	−11.5	+17.1	− 57.0
1890	+44.1	+25.5	+54.5	+62.9	+ 1.0	+20.1	+208.1
1891	+16.8	+26.7	+15.3	−23.7	+ 6.0	+ 1.0	+ 42.1
1892	+14.0	− 4.0	+16.5	+41.2	+ 8.0	+16.5	+ 92.2
1893	+ 7.1	−16.3	+ 9.3	+26.8	+14.0	− 2.9	+ 38.0
1894	+33.3	−23.5	+20.6	+13.3	+12.0	−36.2	+ 19.5
1895	−27.0	−20.4	+26.5	−44.4	+ 9.0	+ 3.8	−105.5
1896	−38.6	+13.3	−32.3	−41.0	−15.7	−11.0	−125.3
1897	−25.5	+25.3	−24.7	+11.8	−15.5	−12.6	− 41.2
1898	−20.2	−11.0	− 9.8	−16.5	−24.8	−27.2	−109.5
1899	−17.8	−12.7	−14.3	−22.9	−11.2	−13.7	− 92.6
1900	− 5.5	− 8.7	−13.1	−15.9	+ 6.4	+10.8	− 26.0
1901	+54.9	−10.4	+30.9	+45.9	+15.9	−18.5	+118.7
1902	+ 0.9	−11.1	− 2.7	−11.7	+ 2.6	−13.4	− 35.4
1903	+ 2.5	− 4.5	+ 6.0	+13.3	0.0	+16.0	+ 33.3
1904	+ 2.4	+24.8	− 5.0	−18.3	− 7.3	− 3.7	− 7.1
1905	− 8.5	− 1.7	−13.9	+ 9.4	−11.8	+13.8	− 12.7
1906	−14.1	−14.3	− 9.5	−10.9	+ 3.8	− 2.1	− 47.1
1907	+ 6.4	+ 9.8	+23.3	+ 5.8	+13.3	+ 4.1	+ 62.7
1908	+19.7	+13.6	+27.8	+20.5	−15.1	−14.9	+ 51.6
1909	+ 9.8	+18.0	+ 6.6	− 9.7	− 4.2	+33.1	+ 53.6
1910	−13.1	+ 3.8	−11.4	− 7.2	+ 7.4	+33.3	+ 12.8
1911	+ 7.2	0.0	+13.3	+32.8	+22.9	−17.4	+ 58.8
1912	−19.4	−14.7	−21.2	−16.7	− 1.3	+ 9.6	− 63.7
1913	+ 9.9	−12.2	− 6.0	+13.5	+ 0.6	+12.0	+ 17.8
1914	− 2.1	+ 7.1	+ 3.9	−19.8	−12.0	−37.3	− 60.2

TABLE V. — INDEX NUMBERS OF COAL AND PIG IRON

Year	Percentage deviations from secular trend		Combined index numbers
	Coal	Iron	
1882	+ 1.9	+ 6.5	+ 8.4
1883	+ 5.3	− 2.0	+ 3.3
1884	+ 3.3	−18.5	−15.2
1885	−10.8	−25.9	−36.7
1886	−13.2	0.0	−13.2
1887	− 2.9	+ 7.8	+ 4.9
1888	+ 6.8	+ 3.0	+ 9.8
1889	− 1.3	+15.7	+14.4
1890	+ 5.1	+32.4	+37.5
1891	+ 8.6	+11.4	+20.0
1892	+10.6	+16.7	+27.3
1893	+ 6.7	−14.6	− 7.9
1894	− 5.3	−26.0	−31.3
1895	+ 1.0	− 1.9	− 0.9
1896	− 6.5	−17.1	−23.6
1897	− 8.8	−13.4	−22.2
1898	− 5.7	− 2.3	− 8.0
1899	+ 0.8	+ 4.3	+ 5.1
1900	0.0	− 2.7	− 2.7
1901	+ 0.7	+ 4.9	+ 5.6
1902	− 3.7	+ 9.1	+ 5.4
1903	+ 6.9	+ 2.7	+ 9.6
1904	− 2.1	−12.4	−14.5
1905	+ 3.0	+14.4	+17.4
1906	+ 1.9	+18.3	+20.2
1907	+11.6	+13.6	+25.2
1908	− 8.4	−33.6	−42.0
1909	− 3.6	+ 2.2	− 1.4
1910	+ 0.8	+ 3.5	+ 4.3
1911	− 4.4	−13.9	−18.3
1912	− 0.4	+ 4.3	+ 3.9
1913	+ 3.1	+ 5.4	+ 8.5

INDEX NUMBERS OF THE TOTAL COST OF LIVING

SUMMARY

I. The use of index numbers of cost of living stimulated by war conditions, 241. — II. Food prices and cost of living may diverge, 243. — III. A fixed collection of commodities and services forms the basis, 244. — IV. The methods of "proportional" and of "aggregate" expenditure, 246. — The proportional method gives a more correct arithmetical result, 250. — The aggregate method more easily understood, 250. — V. Considerations important in the index number for food, 252. — VI. Index numbers for other groups of articles, 256. — VII. American index numbers are fitted to localities, English are not, 259. — Concluding criticism: the methods of constructing index numbers not adequately explained, 262.

I

For a number of years the bureaus of labor in all the more important industrial countries have published index numbers designed to throw light upon changes in the cost of living. The index numbers of this kind in existence at the outbreak of the war differed among themselves both in the intervals at which changes were calculated and in the groups of expenditure included. In 1914 the United States Bureau of Labor Statistics was compiling a monthly index number of retail food prices.[1] The Board of Trade in England was issuing a similar annual index number. The Canadian Labour Department was maintaining a monthly index number of the cost of food, laundry starch, coal, wood, coal oil and rent. In Australia, the Commonwealth Bureau of Statistics was issuing annually an index number of groceries, food and rent. Similar measures of the cost of

[1] The Bureau also published at intervals the prices of gas and coal, but these prices were not combined to form an index number of fuel and lighting.

living were maintained in other countries. None of the index numbers in existence in 1914, however, were well adapted to serve as an element in the determination of wage disputes in a time of rapidly changing prices. The greater part of these index numbers appeared only at considerable intervals — usually a year — and none of them covered the entire cost of living.

As the cost of living increased during the war, and as wage adjustments came more and more under governmental control, the argument that wages should be increased in proportion to the increase in the cost of living figured more and more largely in questions of wage adjustment. It became highly important, therefore, that the extent of the increase in the cost of living should be determined frequently and with as much fullness as circumstances permitted.

The development of the English index number will serve as an illustration of the effect of these considerations. In the autumn of 1914, the Board of Trade began to publish its index number of food prices at more frequent intervals, and it shortly became a monthly index number. In the September, 1915 number of the *Labour Gazette*, the following warning was given:

> This figure [the index number of food prices] relates to food only; and in estimating the increased cost of living generally, this increase must not be applied to total family expenditure, but only to that portion which is expended on food. On the whole the increase in other items of working class expenditure has been considerably less, especially as regards rent.

In June, 1916 a new index number which included all groups of expenditure was established. It is a measure of the "average cost of living of the working classes," and has been published monthly since that date.

In the United States the inauguration of the index number of the total cost of living resulted from a clause

in the agreement between the unions in the shipbuilding industry and the Emergency Fleet Corporation, which provided for a reopening of questions of wages, hours or conditions at not less than six months' intervals "provided it can be shown that there has been a general and material increase in the cost of living." [1] The Shipbuilding Labor Adjustment Board, in order that it might be fully informed of the amount of such increases, requested the Bureau of Labor Statistics to collect statistics of changes in the total cost of living. These index numbers as published from time to time in the *Monthly Labor Review* show the changes in the total cost of living at six months' intervals from December, 1914 to June, 1920 in eighteen industrial cities, and from December, 1917 to June, 1920 in thirteen additional cities.[2]

It is likely that the interest in the development of index numbers of the cost of living aroused by the peculiar circumstances surrounding wage adjustment in war time will continue in time of peace — at least until rapid changes in the cost of living have ceased. Professor Irving Fisher in an article published in the *Monthly Labor Review* for November, 1918 advocated the introduction of a sliding scale of wages based on changes in the cost of living, and more recently this plan has been adopted in England in a number of important labor agreements.[3] The Esch-Cummins Act provides

[1] The full text of the clause was as follows: "At any time after six months have elapsed following such ratified agreement, or any such final decision by the Adjustment Board on any question as to wages, hours or conditions in any plant or district, such question may be reopened by the Adjustment Board for adjustment upon the request of a majority of the craft or crafts at such plant affected by such agreement or decision, provided it can be shown that there has been a general and material increase in the cost of living."

[2] Changes in the cost of the "miscellaneous" group of expenditures were not included in the index numbers prior to that for December, 1918. Until then it was assumed that changes in the cost of the items included in the "miscellaneous" group were the same as the average of the changes in the other groups.

[3] For the details of some of these arrangements, see the Labor Gazette, November, 1919, p. 463.

that in fixing the wages of railroad employees, the Labor Board shall take into consideration as one of the elements the relation between wages and the cost of living.

The review of the problems involved in the making of the American and English index numbers of the total cost of living undertaken here is concerned primarily with the use of such index numbers as elements in fixing wages. The consideration of other index numbers of the same kind, brought into existence by the war, has not been attempted, either because the principle on which they are constructed differs from that adopted by the makers of the English and American index numbers, or because the details of their construction have not been sufficiently revealed.[1]

II

The view has been entertained by some economists that changes in an index number of the total cost of living were likely to correspond fairly closely with changes in the index number of the cost of food.[2] Both the English and American index numbers show, however, that there is frequently a considerable divergence. For example, the index number of food prices for Jacksonville, Florida, for June, 1920 showed an increase of 90 per cent over December, 1914, while the index number for the total cost of living showed an increase of 116 per cent. This is an extreme case, but differences almost as great appear in the same period for other American cities.

So far from its being true that the two kinds of index numbers give identical results, it appears, from both the

[1] Index numbers of the same general character are now maintained in Norway, Denmark and in certain Italian cities.

[2] In a paper by Dr. I. M. Rubinow in the American Economic Review, vol. iv, pp. 793–817 the conclusions as to the movement of real wages are based on the assumption that changes in the index number of food prices coincide with changes in the total cost of living. See also, Adams and Sumner, Labor Problems, p. 512.

English and American figures, that food prices advanced much more rapidly during the early part of the war and were only slowly overtaken by the total cost of living. Over considerable periods of time the correspondence between the cost of food and the cost of living is probably closer than over shorter periods. In wage adjustments, however, the periods of time for which knowledge as to price changes is desired are comparatively short, and it is primarily for use in wage adjustments that index numbers of the cost of living are used. Moreover, it is not certain, and will not be until index numbers of the total cost of living have been compiled for a series of years, just how close is the correspondence between food prices and the total cost of living.

III

In the construction of the English and American index numbers of the total cost of living, the fundamental principle is the same, viz., that the change to be measured is the change in the cost of a collection of commodities and services which shall remain unaltered in quality and amount. The quantity of goods taken as the basis of the calculation is that purchased in the original period. The English and American index numbers are designed, therefore, to show "the average increase in the cost of maintaining the pre-war standard of living of the working class."

With changes in relative prices, changes in the relative amounts of different goods purchased are constantly occurring, but allowance for the effect of such changes are not made in the calculation of these index numbers.[1]

[1] The index numbers of the total cost of living made during the war in Denmark (Copenhagen) and Norway make allowance over certain periods for changes due to changes in relative prices, in the relative amounts of foods consumed. They differ, therefore, in principle from the American and English index numbers.

If the changes so occasioned in the relative amounts of different commodities consumed are of sufficient magnitude, the efficacy of the index number as a measure of changes in the cost of living is destroyed, since the sum of satisfactions derived from the amount of money required to purchase the articles in the original list is now greater by an indeterminate amount than the satisfaction yielded by the original list.[1]

On the ground that the "regimen" set up as a standard in an index number of the total cost of living is not sufficiently stable, Mr. G. H. Knibbs, Commonwealth Statistician of Australia, has argued that index numbers of the total cost of living are less satisfactory than index numbers covering a smaller number of expenditure groups. Mr. Knibbs says:

> Investigations have proved that the percentage of expenditure on food is far greater in families having small incomes than in those having larger incomes, thus indicating that economies in expenditure are primarily effected in regard to matters other than food. The same is true, but to a less extent, in the case of house rent, while, on the other hand, the relative expenditure on amusements, luxuries, and miscellaneous matters is far greater in the case of families having large incomes. Expenditure on clothing remains at a fairly constant percentage in all families grouped according to income. . . . The effect of changes in prices on cost of living should obviously, therefore, be primarily investigated from the standpoint of those commodities, for which the need is first satisfied, and in regard to which changes in price thus have their full influence on the totality of purchases which can be made with a fixed income. The result is that those items of expenditure which have been excluded from this investigation do not adversely affect the validity and utility of the index numbers computed to show the variation in cost of living due to price-fluctuations. The truth of the matter is that if all branches had been included a fictitious result would have been obtained, since total aggregate expenditure is fixed and does not, in the majority of cases, vary with prices, and, therefore, the distribution of expenditure on luxuries, amusements, etc., does not contribute a substan-

[1] On account of such changes from 1914 to 1918 the English Working Classes Cost of Living Committee decided not to use the "fixed regimen" method and adopted instead the "expenditure" method of measuring changes in the cost of living in England from 1914 to 1918. See Report of the Committee [Cd. 8980], 1918.

tially constant regimen, but one which has to be restricted to the surplus available after payment for food, housing accommodation, other necessaries, and conventional comforts. . . .[1]

It will be noted that Mr. Knibbs' argument turns on the assumption that "total aggregate expenditure is fixed and does not vary with prices." The use of index numbers of the cost of living in wage disputes rests, of course, on a directly contrary assumption. The question there is: What wage would give the workmen the same standard of living as they enjoyed at some preceding time? Any effect on the "regimen" of an insufficiency in income to purchase the original "regimen" is *ex hypothesi* ruled out. Only changes in the relative amounts purchased due to price divergences affect the validity of the index number.[2] There is no reason to believe that such price divergences are more marked among the expenditure groups taken as a whole than among those included in the Australian index number.[3]

IV

In making an index number of the total cost of living the natural order of procedure is, first to construct index numbers of the various groups included in the total cost of living, e. g., food, clothing, etc.; and then to combine these into an index number of the cost of living. For convenience in description, this order will be reversed here, and consideration will be given first to the methods used in combining the group index numbers.

There were two possible methods of combination open to the makers of the English and American index

[1] Report No. 1, Labour and Industrial Branch, Commonwealth Bureau of Census and Statistics, Melbourne, 1912, p. 19.

[2] Rationing may be regarded as an extreme form of price divergence.

[3] In later numbers of the Reports of the Labour and Industrial Branch, Mr. Knibbs does not repeat this argument, but defends the exclusion of certain expenditure groups from the Australian index number on different grounds.

numbers, both of which are in accord with the principles on which these index numbers are based. The group index numbers, representing the cost of purchasing at different dates the standard list of commodities for the groups,[1] might have been left as absolute numbers and merely added together to give the index number of the total cost of living. This method — ordinarily known as the "aggregate" method — is followed in Australia and in Canada in the construction of official measures of the cost of living. The makers of the English and American index numbers chose to follow the other plan — usually known as the "proportional expenditure" method. By this method, the index numbers of the groups are expressed as relatives of the cost of purchasing the group list in the base year, and are combined into a weighted average in which the proportional expenditures on the different groups in the base year are used as the weights.[2]

In considering the relative merits of the aggregate and the proportional expenditure methods, two questions present themselves: (1) whether the arithmetical results are the same, and (2) whether one of the methods is superior on other than arithmetical grounds.

(1) The results of the two methods are identical in result only when in the method of proportional expenditure the weights used are the proportions of expenditure in the base period.[3] The assumption that the thing measured is the change in the cost of a fixed list is en-

[1] If the group index numbers are in relative form, they may, of course, be turned into absolute numbers for combinational purposes, if, as is essential under either method, the proportional expenditures on the groups in the original year are known.

[2] The same method has been employed in making most, if not all, of the unofficial index numbers of the cost of living which have been compiled in the United States since the war began. See, for example, War Time Changes in the Cost of Living, published in various editions by the Industrial Conference Board.

[3] The algebraic proof of this proposition may be conveniently found in W. C. Mitchell, Index Numbers of Wholesale Prices in the United States and Foreign Countries, Bulletin of the U. S. Bureau of Labor Statistics No. 173, p. 93. See also, G. H. Knibbs, Prices, Price Indexes and Cost of Living in Australia, Report No. 1 of Labour and Industrial Branch, Commonwealth Bureau of Census and Statistics, Appendix, p. xxviii.

tirely consistent with the fact that under either method when prices in one group increase or decrease as a whole relatively to prices in other groups, the proportional expenditures on the different groups increase or decrease proportionately. If, for example, food prices increase more rapidly than the prices in other groups, the proportion spent on food increases. The proportions in which expenditure is actually made on the different groups are, therefore, constantly changing. But under the method of proportionate expenditure the weights used are the proportions in the base year.

In the calculation of the English index number the group indexes are combined into a weighted average by the use of the proportions in which expenditure was made in 1914 on the different groups.[1] The relative importance of expenditure on the groups in 1914, the base year, was not ascertained from a new collection of budgets, but was estimated from various pre-war studies, especially the budgetary study of 1904 [2] and the inquiry into the cost of living made in 1912. The considerations which governed in making modifications in the proportions of expenditure which had been ascertained for most of the groups a considerable number of years prior to 1914 were of the most general character. The proportions finally adopted vary only slightly from the proportions which were found by the study of 1904.

The procedure followed by the Bureau of Labor Statistics was more exact. In each of the cities for which the change in the cost of living was to be calculated, budgetary studies were made in order to ascertain the proportionate expenditure on the groups. This

[1] "In order to arrive at a single figure representing the increase since July, 1914 in the prices of all the items taken together, the average percentage increases under each of the main groups of expenditure referred to above are combined in accordance with their estimated relative importance in average pre-war working class expenditure." Labour Gazette, March, 1920, p. 119.

[2] British and Foreign Trade and Industry [Cd. 2337], 1904, pp. 1–75.

information was collected late in 1917 and early in 1918 for the year preceding the date of the inquiry. The Bureau, therefore, had in hand data as to proportional expenditure far superior to that possessed by the makers of the English index number. In constructing the index number of the total cost of living, however, the Bureau weighted the group index relatives on the 1914 base by the proportions of expenditure found for the year 1917.[1]

An element of error that varies for each city and for each period was thus introduced.[2] The extent of the error at any given date depends upon two factors: (1) the degree of the divergence in changes in the index numbers of the different groups, and (2) the extent to which a group that diverges in price is weighted. The maximum error occurs, therefore, where a heavily-weighted group shows a large divergence in price change from other groups.[3] The index number of the total cost of living is likely to be affected in larger degree by an error in weighting of this kind than other index numbers, as the food expenditure group forms such a large part of total expenditure. Since the price of food in the United States advanced from 1914 to 1917 more rapidly than the prices of other groups, the proportion spent for food in 1917 was greater than in 1914. Any other assumption violates the principle on which such index numbers are based. By using the 1917 proportions on the 1914 prices

[1] The procedure followed in constructing the index number for Philadelphia, which may be taken as typical, was described in the Monthly Review for March, 1918 as follows: "Schedules covering in detail the income and expenditure for the year 1917 of 512 families were secured. . . . The total increase is a weighted average obtained by multiplying the percentage increase in the retail prices from 1914 to 1917 by the percentage of expenditure item by item in 1917."

[2] It may be noted that exactly the same error was formerly made by the Bureau in calculating its index number of food prices. The relative prices, with base 1890–99, were multiplied by figures which represented the relative importance of expenditure in 1901 — a method which assumed that the proportionate expenditure remained unaltered until 1901. See Bulletin of the Bureau of Labor Statistics No. 156, pp. 360, 361.

[3] For an error in weighting of similar kind, see J. M. Keynes, "Rents, Prices and Wages," Economic Journal, vol. xviii, pp. 272, 655.

as a base, therefore, the increase in the index number of the total cost of living was made greater than it would have been with the use of proper weights. The increase in the cost of living was thus exaggerated.[1]

In the latter part of 1918 the Bureau made a new study of the cost of living in a large number of American cities, in the course of which the proportionate group expenditures for the year preceding the date of the study were ascertained. These proportions were used as weights to calculate the index numbers of the total cost of living for December, 1919 and June, 1920.[2] The preceding index numbers were not, however, recalculated with the new weights. The series as it stands at present, therefore, is an average of group relatives on a 1914 base, weighted in the earlier part by proportionate expenditure as found for the year 1917, and in the later part by proportionate expenditure as found for the year 1917–18.

Even, however, when the weighting is proper, the aggregate and the proportional expenditure methods give arithmetically identical results only if all the items in each of the great divisions of the cost of living are included in the calculation. The budget for each group must be complete. In the case of rent there is no difficulty since rent is a single indivisible item. But in the other groups it is not possible to include all the items in the group indexes, because either the amount or the price of the omitted commodities cannot be ascertained. It is far more feasible to determine the proportional part of the total expenditure which goes for food, for example, than it is to ascertain the quantity pur-

[1] As a test of the amount of error involved, the first of the index numbers calculated by the Bureau — that for Philadelphia — may be taken. The increase in the total cost of living in Philadelphia from 1914 to 1917 according to the Bureau's calculation was 43.81 per cent; with proper weighting it was slightly less than forty per cent.

[2] No notice has been given of this change, except that the new weights are printed in the tables for December, 1919 and June, 1920.

chased in the base year and the prices over a series of months or years of all the items entering into the food budget.

By the aggregate expenditure method, therefore, the cost of living is determined by adding together the cost of a series of items not fully inclusive. The assumption is that on the average the missing items will vary in price as the index number of those included. In the method of proportional expenditure, the assumption is that the missing items will vary in price as the other items in the same group, that is, that food items not included will vary as the index number of the food items included. It is probable that omitted items will vary in price more nearly in accordance with the index number of the group to which they belong than with the index number of the total cost of living. The advantage in this respect is, therefore, with the method of proportional expenditure. As long as the available information is so incomplete that the price changes of only a part of the items can be ascertained, the proportional expenditure method gives a more nearly correct arithmetical result.

(2) Judged by other than arithmetical standards, the superiority of the aggregate method is undoubted. Since the chief practical use of the index number of the total cost of living is to serve as one of the elements in the determination of wages, it is highly desirable that the method of calculation should be easily understood. In this respect the aggregate method is far preferable. The proportional expenditure method requires for its understanding a knowledge of arithmetical processes which is not possessed by the majority of those whose wages are determined by changes in the cost of living.[1]

[1] During the war the Division of Information of the Department of Labor issued placards explaining the method used by the Bureau of Labor Statistics, but it is doubtful whether a mere understanding of the arithmetical processes was efficacious in giving a knowledge of the principle on which the index number was constructed.

On the other hand, the aggregate method is easily understood by any one who can add. Moreover, the principle underlying the two methods — the ascertainment of changes in the sum of the prices of a fixed body of commodities — is grasped at once from the processes of the aggregate method, while the use of weights and relatives in the method of proportional expenditure tends to obscure from those not trained in arithmetical processes the principle on which the calculation is made.

V

Articles of food constitute the most important group of commodities included in the index number of the total cost of living. In the English index number it is reckoned that 60 per cent of expenditure is for food, while in the American index numbers, food constitutes in different cities from 35 to 45 per cent of total expenditure. In the construction of an index number of food prices, the more important considerations relate to (1) the character of the budgetary basis, (2) the averaging of prices obtained from dealers, and (3) the combination of these prices into an index number of food prices.

(1) The English index number of food prices is based, with certain modifications, on the collection of budgets of urban working class families gathered by the Board of Trade in 1904.[1] The U. S. Bureau of Labor Statistics weights its index number of food prices by means of data collected in 1901.[2] The English index number is weighted by the proportionate expenditure method, while the American number is an aggregate and is, therefore, weighted by the absolute amounts of the articles consumed. The chief question raised in this

[1] The Labour Gazette, March, 1920, p. 2.

[2] Cost of Living and Food Prices, Thirteenth Annual Report of the Commissioner of Labor, 1913.

connection is whether in either case the weights used are proper weights, in view of the considerable period which has elapsed since the inquiries on which they are based were made.

The makers of the English index number defend the use of the 1904 weights by the following argument:

> The adoption of "weights" based on the expenditure of 1904 was not invalidated by changes in quantities between 1904 and 1914, because the changes in quantity, which were generally slight, were largely counterbalanced by changes in price level, with the results that the proportions of income spent on the different commodities could not have been sensibly altered, except as regards margarine for which a special allowance was made.[1]

The evidence for the statement that changes in quantity were generally slight is not given, but consists presumably of export, import and production statistics.[2]

In the United States the Bureau of Labor Statistics used as weights, without change, the quantities of the articles of food consumed in 1901. The only available information as to working men's dietaries comparable in extent with that collected in 1901 is to be found in the analysis made by the Bureau of the budgets of shipyard workers collected in 1917–18,[3] and in the results of the 1918 cost of living investigation of the Bureau.[4] It appears from both these investigations that a very considerable change in diet had occurred between 1901 and 1917–18. There was a marked reduction, for example, in the consumption of all kinds of meats. The question

[1] The Labour Gazette, March, 1920, p. 2.

[2] The Working Classes Cost of Living Committee, 1918, which reached the same conclusion, said: "Between 1904 and 1914 no public investigation of the cost of living was set on foot in this country, but a considerable number of budgets were collected in limited areas by various private enquirers. It is fairly certain, from analysis of the production, imports and exports of staple foods, that during this decade no considerable changes took place in the standard of living and published statistics as to the course of prices and similar matters afforded us trustworthy checks. Report of Committee [Cd. 8980], 1918, p. 4.

[3] Monthly Labor Review, December, 1918, pp. 115–146.

[4] Ibid., July, 1920, pp. 1–10.

may be raised whether these changes were an effect of war conditions or due to more permanent causes. It is extremely improbable, however, that such important changes were entirely or even largely due to the war. The investigations of the English Working Classes Cost of Living Committee show far less important changes in English working class dietary between 1914 and 1918. There seems to be strong reason to believe that the food budget of 1901 was not a correct budget for 1914.

Whether the use of the 1901 budget has affected materially the arithmetical result is more doubtful. The movement of retail food prices from 1914 to 1920 in the United States has not been characterized by such disproportionate increases in the prices of certain food products as have occurred during the same period in England, and the character of the budget used as a base is therefore arithmetically less important. There have been, however, notable cases of inequalities in price changes among different food articles, and all uncertainty should be removed at the earliest practicable time by the adoption of a modernized food budget,[1] and the recalculation of the index number of food prices.

(2) The construction of index numbers of retail prices involves one process — the ascertaining of average prices for each article — that does not concern to anything like the same degree the maker of indexes of wholesale prices. Retail prices must be gathered from many dealers and averaged, since there are no single market prices. The method pursued by the makers of the English index number is to have local officers obtain

[1] In December, 1918, Commissioner Meeker said: "There was no time to calculate new weights based on the quantities of each article consumed in the average workman's family today, so the old and rather imperfect weights used in the 1901 study had to be used. We can and ought to revise these weights, using the facts as to family consumption we are finding in the present study." Proceedings, American Economic Association, 1918, p. 110. Two years have elapsed since this statement was made, but the same food budget is still used by the Bureau.

from merchants in each locality prices of the various food articles, and "forward statements showing for each article of food included the predominant price at the current date, and the amount of the change in such prices since the previous report." [1] These prices are then averaged by taking an unweighted arithmetic mean separately for towns under 50,000 and for towns of 50,000 and over. The percentage increase in the price of each article as against July, 1914 is then calculated for each class of towns. The arithmetic mean of these percentages gives the increase for the United Kingdom. In making its averages of local food prices, the Bureau of Labor Statistics uses quotations only from local merchants who made quotations at both the dates which are being compared. An arithmetic average of the actual prices is made.

Both in England and the United States, it will be noted, the attention of the index number makers has been directed primarily to guarding against the possible insufficiency of the price samples. The difficulty lies in the fact that quotations can be secured from only a small part of the merchants and there is no knowledge of the relative amounts sold by each. What is really desired is the change in the average price, for example, of sugar, and to get this with certainty it is necessary to know the total number of pounds of sugar sold at the two dates and the total sums received for sugar. If these facts could be ascertained in full, the average prices at the two dates would also give the price change. But since such complete information is unobtainable, the inquirer must fall back on some system of sampling.

In the use of the predominant price, the theory presumably is that the predominant price is a better indi-

[1] The average prices of commodities other than food are not ascertained by the "predominant price" method, but either by the "identical firm" method, or by merely averaging the prices received from a number of retailers.

cation of the average price than an average of the prices collected. This is, of course, to assume that such price changes conform to a definite form of grouping. The device of the "identical firm" is based on the theory that samples of changes are more trustworthy than the same number of samples of prices. Whether these methods do give different and better results than would be given by arithmetic averages of ordinary samples cannot be judged, since data are not available. There is great need of experimental inquiries into the subject of the kind that Professor W. C. Mitchell has made in the kindred field of wholesale prices.

(3) The combination of the prices, average or predominant, into an index number of food prices raises questions of the same kind as have previously been discussed. In the English index number the average prices are turned into relatives on a 1914 base and then combined into a single number for food prices by using the figures for proportional expenditure as found by the 1904 inquiry. In the United States, the average prices of food are multiplied by the quantity found by the 1901 inquiry. As has been pointed out above, the two methods give the same arithmetical result. Unfortunately, altho the American index of food prices in construction is an aggregate, it is not published as such, but is converted into a relative before publication.

VI

In the construction of index numbers for the groups of expenditure other than food — clothing, fuel and light, etc.[1] — the most important difference between the

[1] It is impossible to compare the methods used in the construction of the index numbers for rent. No information on that point is contained in the publications of the Bureau of Labor Statistics, and in England on account of the Increase of Rents Restriction Act, which limited the increase in rents to an amount equivalent to the increase in rates, the methods employed in estimating rent increases have not been comparable with those suitable under other conditions.

American and English index numbers is in the methods used in combining the average prices of commodities into group index numbers. The Bureau of Labor Statistics combines the average prices of the articles included in the groups into group index numbers by the so-called "unweighted" method, while the English group index numbers are weighted according to proportionate expenditure in 1914. The weights used are in some cases very rough, and lack a satisfactory basis in budgetary study.

In a paper read before the American Economic Association in 1918, Dr. Royal Meeker, Commissioner of Labor Statistics, said:

> Except for articles of food, the individual items of consumption are not weighted within each group or class, according to their importance in the family budget. In the clothing group, for instance, suits, night shirts, socks, caps, shoes, neckties, shirts and handkerchiefs all have equal weight. Quite possibly weighting within the groups will not change the percentage change in cost of the groups as wholes, but we have no ground for assuming this to be the case. To be sure, all experience has shown that it makes but little difference what methods are used in computing an index number. However, science, common sense and expediency all require the extension of the weighting of individual items to all groups of the family budget.[1]

It is not clear from this description exactly how the combination into an index number is made. There is, of course, no such thing as an "unweighted" index number and, presumably, one of two methods was followed. Either the price of one suit of clothes, of one collar, of one pair of socks, etc., were added together and divided by the number of articles, in which case it was assumed that the consumer purchased one of each article; or the price of each article in 1914 was called 100, the relative prices computed for succeeding years, and the sum of the relatives divided by the number of items, in which case

[1] American Economic Review, March, 1919, Supplement, p. 110.

it was assumed that consumers spent in 1914 equal sums on each of the articles.

In the absence of information as to what articles are included in the group index numbers or as to the prices of these articles, it is impossible to verify the suggestion of the Commissioner that weighting might not affect the result. There is one piece of evidence, however, that points — so far as clothing prices are concerned — in a contrary direction. The National Industrial Conference Board has compiled an index number of the movement in the cost of living since July, 1914. In this index number the increase in the price of clothing is calculated by the use of weights based on clothing budgets. The increase in the Board's index number for clothing from July, 1914 to November, 1919 for the United States as a whole was 135 per cent, while the median of the increases in the eighteen cities covered by the Bureau of Labor Statistics from December, 1914 to December, 1919 was 175 per cent. The dates are not exactly comparable, but sufficiently so; for we know that there was little or no increase in clothing prices before December, 1914 and the ends of the periods nearly coincide.

Entirely apart from the question of arithmetical result, it is desirable on other grounds that cost-of-living index numbers should be deliberately weighted. It would be a sufficient justification for using the "unweighted" method in making an index number of wholesale prices, if it could be shown that identical results were secured by the two methods, since no one has an immediate monetary interest in such index numbers. But the case is different with index numbers of the cost of living. Here the interest is immediate and mere identity of result is not sufficient to justify the use of a method which does not commend itself to the untutored intelligence of the parties concerned. Even the

crudest system of deliberate weighting is superior to the unconscious weighting involved in "unweighted" index numbers.

VII

It is a fundamental principle of index numbers of the cost of living that the more closely the weights and prices are related to a particular place the more exactly they represent changes in the cost of living of persons living in that place. It follows that the most desirable index number for a particular place is one made from local prices and weighted throughout according to local consumption. The English and American index numbers differ markedly in that the English index number is calculated for the country as a whole, while the American index numbers are city indexes.

The group weights, the weights given articles within the groups, and the prices in the English index number, are averages for the whole country. The predominant prices of food articles are averaged for two classes of cities and these averages are then combined to give an average price for the country. The index numbers for other groups are made directly from dealers' quotations, the prices secured from all dealers being averaged without regard to location.[1] Prices and working-class consumption probably differ less from place to place in England than in the United States, and a single index number made in this manner, therefore, represents changes in the cost of living more accurately for any one city than it would in the United States.

[1] The following statement for fuel and light illustrates the method employed: "The items included in this group are coal, gas, oil, candles, and matches. Statements are obtained each month from correspondents as to the prices of coal in 30 of the principal towns and of gas in 26 of the principal towns. . . . Returns as to the prices of oil, candles, and matches are obtained each month from retailers in 28 of the principal towns. . . . The prices quoted are tabulated and scrutinized, and an average price is then arrived at . . . by totalling the quotations and dividing by the number of entries." Labour Gazette, March, 1920, p. 119.

Altho the American index numbers are nominally city index numbers, they are only partially fitted to local conditions.[1] The proportions of income expended on the different groups are ascertained for each locality included, and the importance of each group of expenditures is weighted for each city in accordance with local expenditure. The prices used are averages of local dealers' prices.[2] But the weights given articles within the groups are not based on local consumption. In the food group, presumably, altho no explicit statement to this effect can be cited, the weights used are those found for the district in which the city is located by the inquiry made in 1901. The other expenditure groups are "unweighted," that is, the weighting is the same in Los Angeles as in New York. There are great differences among American cities in the relative amounts spent on the articles in each of these groups. Great variations exist in the proportions, for example, in which various kinds of coal, gas, oil and wood are used as fuel. But of these differences the city index numbers as now constructed take no account.

Index numbers fitted to local conditions have also an important advantage in construction. A prime problem in index numbers of the total cost of living lies in the difficulty in certain expenditure groups in finding standardized and identifiable commodities which shall be uniform throughout the area covered. In the food group, this problem is not incapable of solution, but in the other groups the solution is never completely satisfactory. The smaller the area for which the index number is calculated, the less is the difficulty presented, since

[1] Tho not completely local, the American city index numbers show wide differences in fluctuations. In June, 1920, for example, the increase in the cost of living over December, 1914 was 136 per cent in Detroit as against 96 per cent in San Francisco and Oakland.

[2] Monthly Labor Review, August, 1918, p. 135.

the qualities of the articles vary less and it is more practicable to fix on some one grade as predominant. For example, altho in the United States as a whole numerous kinds of coal are used as fuel, in any particular city the number of kinds and qualities is very much less.

The making of separate index numbers for a number of cities involves, of course, a study of budgets in each of the cities and, therefore, requires a larger amount of preliminary work than would be required for the making of a national budget. It seems probable, however, that a much smaller number of budgets than has heretofore been used in the United States would be scientifically sufficient as a basis for satisfactory consumption weights. In the great inquiry of 1901, the Bureau of Labor collected 25,448 budgets; the Report of the English Working Classes Cost of Living Committee, which covers much the same ground so far as our present interest is concerned, is based on 971 budgets. Calculations of the "standard deviations" of several groups of budgets were made for the Committee and it appears that the "standard deviation" for a group of 100 budgets was 3 per cent and for the whole group of 971 budgets only 1 per cent of the average expenditure for food.[1]

From local index numbers it is possible to form national index numbers which would be superior to national index numbers that are computed on the basis of national averages of prices and consumption. An average of the changes in the cost of living in the different cities, weighted by the population of each city, would give the average change for the country in the cost of

[1] Report of Working Classes Cost of Living Committee [Cd. 8980], 1918, pp. 14, 15. Five hundred and seventy-one budgets were gathered by the Bureau of Labor Statistics for Philadelphia alone. It would be interesting to know how the Bureau decides on the necessary number of budgets.

living in the sense in which it is used by the ordinary man and in wage adjustments. In the October, 1920 number of the *Monthly Labor Review* the Bureau of Labor Statistics presents for the first time a national index number of the total cost of living. Unfortunately almost all the advantages of already having local numbers are lost in the method of combination adopted. The percentage increases in the different cities for each group of expenditure are averaged, and these are combined into an index number by the use of weights of proportionate expenditure secured by averaging the proportions of expenditure in the cities. An index number is thus constructed on the assumption that the proportionate expenditure on the groups and within the groups is the same in all the cities.

In conclusion, one important criticism of these index numbers may be offered. As has been noted at various points in the foregoing discussion, the methods employed in the construction of the American index number have never been set forth fully in any official description. They must be inferred chiefly from papers read by the Commissioner and from descriptions published some years since of the method of constructing the index number of food prices. Even with these aids many points are still obscure. Just what articles of clothing, for example, are included and whether they are combined by an average of actual prices or of relatives remains uncertain. Again, we are not told what articles are included in the index number of fuel and lighting. The information as to the English index number is far more satisfactory. The description in the *Labour Gazette* for March, 1920, the only source of detailed information, was not published, however, until three years after the first appearance of the index number.

During that period, an index number which was much used in the adjustment of wages had to be taken on faith.[1] Moreover, the present information is by no means entirely satisfactory. For example, in the account of the methods followed in making the group index number for "other items" the *Gazette* says: "The increases so ascertained for each item have been combined, after consideration of the relative importance of the different items, so as to enable the Department to form an estimate of the average increase of these items taken as a whole and its effect on the general percentage increase for all items." But what is the "relative importance given to these items?" [2]

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[1] The old form of explanation is exemplified in the following extract from the March, 1919 number of the Labour Gazette: "The average level of rents has only increased very slightly (as a result of increases in local rates), but the prices of other items have advanced so substantially that the general increase in the prices of all the items ordinarily entering into the working class family budget (including food, rent, clothing, fuel and light, etc.) between July, 1914 and March 3, 1919 is estimated at 115 per cent, taking for this calculation the same quantities, and, as far as possible, the same qualities of the various items in March, 1919 as in July, 1914. If the amount of increased taxation on commodities is deducted the increase is about 7 per cent less."

[2] The recent British Empire Statistical Conference adopted the following recommendation: "That in all cases in which an Index-Number is first issued or revised by a Government Department, it should be accompanied by a statement of the methods employed and the data used in its construction, giving sufficient detail to permit of its reconstruction by a reader. . . ."

A STATISTICAL ANALYSIS OF THE RELATION BETWEEN COST AND PRICE

SUMMARY

Marginal cost and price, 265. — Bulk-line cost, 267. — Dispersions of costs in different interests, 268. — Relations of price, cost, and gross profit on investment, 270. — Difficulties in using the Commission's costs, 271. — Book paper, 273. — Newsprint paper, 278. — Canned salmon, 281. — Sugar beets, 283. — Copper, 285. — Conclusions, 286.

THE economist usually maintains that over a sufficiently long period price will bear some relation to cost, even tho at any one time they may be entirely out of adjustment. As to just what that relation is, and whether there is conformity to modal, or marginal cost, the economists are not entirely agreed. Walker's contention that price will tend to conform to the cost of the marginal producer has only been generally accepted with a considerable number of qualifications. The concepts of the marginal producer and of the marginal cost require careful analysis before they can be used for any practical purposes.

There are two ways of defining the marginal producer and the marginal cost. The first defines the marginal producer of a certain year — assuming that year to be normal — as the producer whose sales realizations approximately equal his expenses (including interest on his invested capital). It is obvious that, according to this definition, the cost of the marginal producer of any one period corresponds with price, even tho his cost could not be called price-determining. The marginal producer in this sense is not necessarily the highest cost producer,

inasmuch as the highest cost producer even in a normal period may suffer a loss. The marginal producer, as here defined, is the producer who at any normal period breaks even, i. e., earns just enough to pay his expenses. There are certain objections to this definition: it merely locates the position of the marginal producer on the cost curve after the price has been determined, and it can be used only when the period under consideration is a normal one.

Another method of defining the marginal producer practically assumes that the marginal producer of one year remains the marginal producer through a considerable period. This second definition classifies him as the producer who just manages to hold his position in the industry. In one year he may make a small profit; in another year he may suffer a small loss; in still another year he may merely earn interest on his capital investment. He usually remains in the industry because of the hope of future profit or because of the difficulty involved in the withdrawal of his investment. (It should be noted that even the producers with higher costs than those of the marginal producers will often remain in an industry for a considerable period due to the difficulty of withdrawing their capital investments. Economic theory naturally, but often inaccurately, assumes the absolute fluidity of capital.) The difficulty with the second definition is that in many cases there is no such producer existing in fact. The marginal producer of one year may and often does become a relatively low cost producer in the next year, even tho conditions of supply and demand remain reasonably constant. It may be necessary at times, therefore, to abandon the concept of the marginal producer as a continuous personality, and to direct attention to the marginal cost and to the marginal product. Since the marginal producer, as a per-

son, does not always exist, it is impossible at times to locate any business organization that has occupied the position of the marginal producer through a series of years.

Both of these definitions assume that the marginal producer is the producer whose cost is equal to price under normal conditions of competition and whose cost is approximated by price over any considerable period, even tho at particular times abnormal conditions may have led to maladjustment. But neither of these definitions would enable the economist to locate the marginal cost immediately. The first presupposes the determination of price under normal competitive conditions before the marginal cost can be located, and the second is in many cases impracticable. As has been explained, the highest costs of any normal period are not necessarily the marginal costs; they are sporadic and usually apply to a very small part of the total production. They are the costs of producers who may at any time leave the industry. The marginal producer, therefore, must take a position in normal times somewhat lower on the cost curve than the position occupied by these highest cost producers. Furthermore, the marginal cost could not be expected in normal times to fall below the average or modal costs. The marginal position on the cost curve, therefore, would probably be somewhere between the highest costs and the modal costs. The modal costs are assumed to be the costs of the representative producers. Altho the modal costs are certainly in one sense the representative costs, it is not always true that they correspond accurately to the costs of the so-called representative producers. When the mode is not clearly defined or when there is more than one mode, this qualification is more evident. The limiting positions of the marginal cost would probably be, then, the highest cost at the one end and the modal cost at the other.

In order to determine the position of the marginal cost more accurately, it would be necessary to take cost groups for a number of industries and to find at what point along this curve normal competitive conditions caused price to fall. In the February *Quarterly Journal* (1918) Professor Taussig maintains that if differences in cost rest on physical causes — if they are due to forces in nature, not in man — the normal or long period price may be expected to conform to marginal cost, but that if they rest on the differing abilities of men, the normal price may be expected rather to conform to average cost, or at all events to fall below the "bulk line." The "bulk line" represents the position on the cost curve just below that occupied by the highest (usually sporadic) costs. The "bulk line" position is located at the break in the curve, i. e., at the cost group in which the production is considerable, but immediately below the groups in which the production is very small. It might be expected that the bulk-line cost would be found under normal conditions of competition to be the marginal or price-determining cost. Professor Taussig's analysis admits this for agriculture and mining. But only a comparison of a large number of actual costs and competitively fixed prices can solve this problem. In the present paper an attempt will be made to determine exactly where, under reasonably normal conditions of competition, prices actually fell along the cost curves which are available for study. Altho no large number of such costs and prices have been published, the method to be used will be set forth in this paper and applied to the available data.

If Professor Taussig's distinction between those costs affected by natural advantage and those affected by human ability is valid, the relation between price and cost may be different for the two types of industries.

Economists who emphasize this distinction probably would not maintain that agricultural costs and mining costs are never influenced by purely natural or even physical causes. Furthermore, in certain industries (primarily manufacturing), some companies produce their own raw materials; costs in such industries are, therefore, subject to some extent to the principles that apply to extractive industries.[1] The more significant distinction, then, is not merely between extractive and manufacturing industries. It is rather between industries where the costs are widely dispersed and stand in certain definite and fixed relations to each other and industries where costs group themselves around the cost of the modal producers. However, if it could be shown that the dispersion of the costs in manufacturing industries is not so great as in mining and agriculture, the hypothesis that human abilities do not result in such persistent cost differences as natural advantages might be proved. The average deviations (divided by the means) of the cost groups to be used for later analysis have been calculated as the measures of dispersion. The deviations were measured from the means rather than the modes, because the modes were not in all cases clearly distinguishable. For some of the groups there were two modes. Furthermore, in practically every case the actual mean was given. The coefficients of dispersion are given in the table on page 269.

Altho these figures are not sufficient for any thorogoing generalizations, the dispersions for the manufacturing costs do seem to have been, on the whole, lower than for those costs affected by natural causes. The figure for copper seems low for an extractive industry; this is also true of the sugar beet figure for the

[1] See Mr. P. G. Wright's article on sugar costs in this Journal, November, 1917, p. 101.

Industry	Year	Coefficients of dispersion (based on the average deviations)
Book paper	1916	.15
	1917	.09
Newsprint	1913	.12
	1914	.11
	1915	.10
	1916 (½)	.11
Salmon	1916	.21
	1917	.33
Red salmon	1916	.21
	1917	.20
Sugar beets	1913	....
Michigan district	....	.20
Ohio-Indiana district	....	.16
California district	....	.21
Copper	1918	.18

Ohio-Indiana district. On the other hand, the figures for salmon seem somewhat large; this may be explained by the fact that a considerable number of the canners have their own exclusive fishing grounds, and, as a result, their costs are affected by natural factors as well as by human abilities. The figures indicate a tendency but present no conclusive evidence as to the distinction between manufacturing and extractive costs. It will be interesting to consider in the analysis which is to follow whether the dispersions of the various cost groups have affected the relations between costs and prices.

The statistical material on costs and prices is meager. The Federal Trade Commission, the successor to the old Bureau of Corporations, has published most of the figures which can be used in the present discussion. But

even these figures are not entirely applicable to the kind of analysis which is here necessary. The Commission's investigations were undertaken for the very reason that more or less abnormal conditions prevailed in the industries under consideration. There are other minor difficulties involved in the use of its reports. In the paper in this Journal (November, 1919), already referred to, the necessity of considering interest on investment as a cost item in determining a price or the fairness of a price was implied. The accountants have been in the habit of combining interest and profit and of calling them return on investment. Of course, it is reasonable that the interest of any particular producer should bear some relation to his investment but that profit should bear any such relation presupposes that efficiency or good luck, as evinced by the lowness of cost, would be absolutely dependent upon the size of the investment. There may be reason to believe that the larger the investment per unit of product, the smaller will be the cost per unit of product — the man who has more machinery (an item of investment) will need less labor (an item of cost). For a number of other reasons, the man who has the larger investment can ordinarily be expected to have the lower cost. But this is true only in a general way and does not take into account the varying abilities and the varying fortunes of different producers. In some cases producers with small investments (per unit of product) may show low costs and make large profits. Thus, the profit (pure profit) of any one producer may be as high as 80 per cent of his investment, while that of another producer may be less than 5 per cent and justly so. That the total profits (gross profits, including interest and profit) of all the producers in an industry divided by the total invested capital will tend to be constant and probably even determinable is an

economic doctrine which results from the fluidity of capital and from the additional fact that any one large group of men is probably about as clever as any other large group. If all of the producers in any one industry are earning abnormally large profits, capital will flow into that industry unless monopoly conditions or unfair methods of competition restrict it. And the reverse is true if the average profit in an industry is unusually small.

The fact that the total profits of an industry divided by the total investment should represent a rather constant percentage enables the student to determine whether the industry under consideration is operating under normal conditions. If an industry as a whole is earning 20 or 30 per cent (interest and profit together) on its total invested capital, the profits may be considered abnormally large; if the average return is less than 6 or 7 per cent, the profits may be considered abnormally small. In either case conditions could not be considered normal. Generally speaking, prices may be considered competitively fixed and in their normal relation to costs when the industry as a whole has earned an average gross profit of anywhere from 9 to 12 per cent on investment.

The costs given in the reports of the Federal Trade Commission include no interest on investment, and in some cases no investment figures are given. In practically none of the reports is the investment (per unit of product) for each group of producers given; in but a few cases is the average investment for the industry as a whole shown. The obvious difficulty in using interest on investment in cost analysis is the great difficulty involved in determining the interest rate that should be allowed. Accountants may be justified in restraining producers — particularly inefficient ones — from in-

cluding large interest charges in cost before determining upon a proper selling price. Furthermore, the difficulty involved in squeezing out inflation before determining the true investment has militated against the inclusion of interest. In the analysis to follow, investment per unit of product is estimated, and interest is charged usually at about 5 per cent.[1]

In most of the Commission's reports, altho the average of the highest group of costs is usually given, it is impossible to find the highest cost. The modal cost can, of course, be approximated from the cost groups, but the average of the modal group can be found at a glance in most cases from the Commission's figures. From the definition of marginal cost already given it is clear that the exact position of the marginal cost could not be determined until after average price was known. Altho this may be strictly true, it will be shown that the position of the marginal cost will not be very different from what it would seem to be *a priori* when conditions of competition (as shown by return on investment) are reasonably normal. In most cases there will be a small production at very high costs; just below the production at these high costs there will be a relatively large production. Where this break occurs, the marginal product should probably be looked for. It is unfortunate that the different producers in the cost groups cannot be identified; otherwise, it would be interesting to find out in what cases the marginal producers continue to be marginal from year to year. This would be particularly valuable in considering the permanence of the modal or so-called representative producers.

There are certain other difficulties involved in the comparison of the Commission's costs with prices. In

[1] For a discussion of the relation between interest, profit, and risk, see the writer's article in this Journal, November, 1919, on "Price Fixing and the Theory of Profit."

this paper the average price at which all the sales were made has been used. It has been assumed that the different prices at which the same commodity is sold during the year will tend to be uniform. Of course, this is often an unwarranted assumption, and will be particularly misleading when there are different grades.[1] The average price used was derived from net sales, which is ordinarily obtained after deducting outward freight, discounts, and allowances. These items were not included in cost and therefore should be deducted from price even when the manufacturer pays them. There is much to be said for including in cost cash discounts and outward freights (when the commodities are sold delivered).

The cost and price figures for five industries have been chosen for statistical analysis. These industries have already been indicated in the table showing the cost dispersions (p. 269). They are book paper, newsprint paper, canned salmon, sugar beets, and copper.

Book-Paper Costs and Prices

The Federal Trade Commission has published the costs of producing book paper for the 39 principal mills in 1915 and 1916.[2] They are given in the table on page 274.

These figures are presented graphically on Charts V and VI.

The correspondence of the modal cost and the average cost represents the first problem to be considered. Exact correspondence assumes an absolutely symmetrical normal frequency curve. In this case, the curves for both years are asymmetrical. However, in 1915 the weighted average cost was $62.24, whereas the modal cost was

[1] For varying prices realised, see copper prices, p. 285.

[2] The Book-Paper Industry, Government Printing Office, 1917, p. 67, Table 21.

Group	1915				1916			
	No. of mills	Tons produced	Per cent of total	Average cost per ton	No. of mills	Tons produced	Per cent of total	Average cost per ton
I. $50 and less than $55	5	116,718	18.10	$52.19	..	..	..	..
II. 55 " " " 60	4	147,094	22.81	57.03	6	210,639	27.27	$57.38
III. 60 " " " 65	12	176,527	27.37	62.05	5	136,463	17.66	63.92
IV. 65 " " " 70	8	85,112	13.20	67.51	1	35,838	4.64	67.45
V. 70 " " " 75	4	57,038	8.85	71.85	8	128,040	16.57	72.58
VI. 75 " " " 80	4	50,971	7.90	77.11	9	112,919	14.62	77.88
VII. 80 " " " 85	2	11,442	1.77	81.51	4	92,380	11.96	81.77
VIII. 85 " " " 90	..	..	..	..	4	33,732	4.37	87.62
IX. 90 " over	..	..	..	..	2	22,521	2.91	95.57
Total	39	644,902	100.00	$62.24	39	772,532	100.00	$69.87

$61.85. In 1916 the mode is not clearly defined. It is somewhere in the group between $70 and $80, whereas the average cost was only $69.87.

In order to compare the different costs with the average selling price per ton of book paper it will be necessary to make allowance for interest and selling expense. It has already been explained that no interest on investment was included in the costs shown in these tables. In this industry the average investment was apparently about $95.00 per ton in 1915, and appeared to be only about $75.00 per ton in 1916 (probably because of the larger output).[1] If 5 per cent interest were used as a basis for calculation, an average interest on investment would be about $4.75 in 1915 and $3.75 in 1916. Selling expense in these two years amounted to about $.80 per ton. It could not be assumed that these interest charges would be applicable either to the marginal costs or the modal costs, altho their applicability to the modal costs would probably be more justifiable. The higher cost producers might be expected to show lower interest charges than

[1] These investment figures have to be estimated from material in the Commission's report. They seem reasonably accurate.

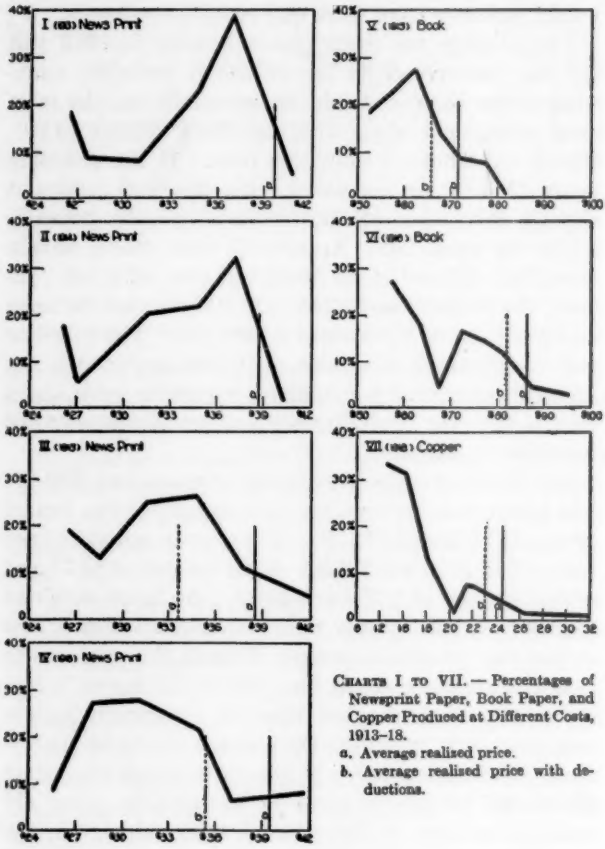
the average shown, inasmuch as high cost producers would probably have relatively small investments.

The average net price (per ton sold) in 1915 was $71.39.[1] Interest of $4.75 — which is probably somewhat larger than it should be, especially for the marginal producer — along with the selling expense ($.80), should be deducted from this price. If the resulting figure ($65.84) be compared with the cost groups it appears that price was not much above the group in which the mode falls. Apparently there was a certain quantity produced at no profit and even at a loss. Indeed, the industry averaged only 8.3 per cent (interest and profit) on its investment in this year. The bulk-line cost is difficult to determine in this table, but it is not impossible to locate it just above where the price might seem to indicate. Bulk-line cost and modal cost were not far apart in this case.

In 1916 the weighted arithmetic average cost ($69.87) was somewhere between the averages of the two modal groups ($57.38 and $72.58). The average net price (per ton sold) in 1916 was $86.83. If the interest of $3.75 and selling expense of $.75 be deducted, the figure obtained ($82.33) is much higher than the average cost or the cost of the two modal groups. Price in this case was as near the highest costs as the costs in the higher modal group, or even nearer; but price was abnormally high in this year, as is shown by the average return on investment (21.52 per cent).[2] If the costs above the group $80.00–$85.00 are assumed to be sporadic, price will seem to conform to the costs of the producers in the bulk-line group, which in this case was near the highest cost groups.

The two years for which these costs were shown were probably abnormal years for the industry. The Com-

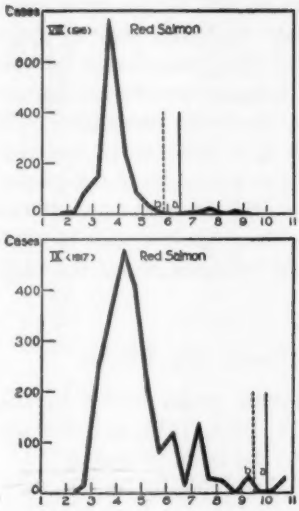
[1] Book-Paper Industry, p. 78, Table 31. [2] Ibid., p. 80, Table 34.



CHARTS I TO VII. — Percentages of Newsprint Paper, Book Paper, and Copper Produced at Different Costs, 1913–18.

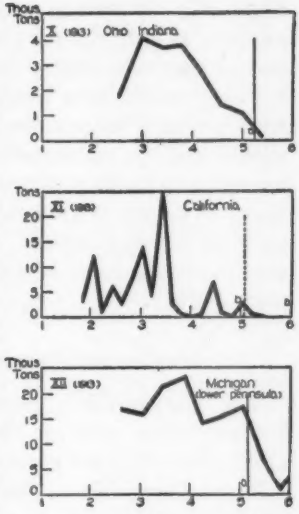
a. Average realised price.

b. Average realised price with deductions.



CHARTS VIII AND IX. — Cases of Red Salmon Produced at Different Costs in 1916–17.

a. Average realised price.



CHARTS X TO XII. — Tons of Sugar Beets Produced at Different Costs in Various States in 1913.

b. Average realised price with deductions.

mission's report showed that the average return on investment for 21 companies (which were probably the larger and more successful companies) was 21.52 per cent in 1916. This was an abnormal profit; prices were high. But the average return in 1915 for the same companies was only 8.3 per cent. Probably both of these percentages were higher than the true average for the industry would have been, because investment figures were probably secured from the better companies. (It should still be remembered that this return includes interest and profit.) There were a number of companies that lost money in 1915 (i. e., did not earn any interest on their invested capital). Thus the low price in 1916 may have had some effect in bringing about the high price of 1917.

Newsprint Paper Costs and Prices

The Commission's newsprint paper costs in the United States mills for 1913, 1914, 1915, and for the first half of 1916 are given in the table on page 279.[1]

These figures are presented graphically on Charts I, II, III, and IV.

The average cost did not correspond in the first two years to the average costs of the modal groups. In both 1913 and 1914 it was approximately $4.00 lower than the modal costs. In 1915 the two corresponded more closely, and in 1916 they were practically identical. The mode in 1915 was about $33.95 and in 1916 about $31.34.

It is almost impossible to compare the prices of 1913 and 1914 with the costs of those years, as no investment figures are given. The average investment per ton in 1915 was apparently about $86.00.[2] Interest at 5 per

[1] News-Print Paper Industry, p. 9, Table 18.

[2] Investment figures have to be estimated from material in the Commission's report. These figures in the case of newsprint paper seem reasonably accurate. See p. 112.

Group	No. of mills	Tons produced	Per cent of total	Average cost per ton
1913				
I. Less than $27	2	169,548	18.0	$26.51
II. $27 and less than $30	3	82,773	8.7	27.57
III. $30 " " " $33	1	75,290	8.0	30.97
IV. $33 " " " $36	8	214,678	22.7	34.66
V. $36 " " " $40	14	361,602	38.3	36.93
VI. $40 " over	2	40,472	4.3	40.80
Total	30	944,363	100.0	$33.42
1914				
I. Less than $27	3	192,705	18.5	$26.27
II. $27 and less than $30	1	59,681	5.7	27.17
III. $30 " " " $33	4	210,113	20.1	31.66
IV. $33 " " " $36	12	229,201	22.0	34.97
V. $36 " " " $40	13	338,522	32.4	37.32
VI. $40 " over	2	13,308	1.3	40.43
Total	35	1,043,530	100.0	$33.08
1915				
I. Less than $27	3	195,830	19.1	$26.64
II. $27 and less than $30	2	138,934	13.5	28.51
III. $30 " " " $33	8	260,505	25.4	31.64
IV. $33 " " " $36	11	276,672	27.0	34.75
V. $36 " " " $40	8	120,199	11.7	37.74
VI. $40 " over	3	33,321	3.3	43.67
Total	35	1,025,461	100.0	$32.21
1916 (first half)				
I. Less than $27	2	47,436	8.8	$25.56
II. $27 and less than $30	4	146,850	27.2	28.10
III. $30 " " " $33	10	150,233	27.8	31.30
IV. $33 " " " $36	8	117,729	21.8	34.96
V. $36 " " " $40	6	34,441	6.4	37.03
VI. $40 " over	4	43,147	8.0	41.76
Total	34	539,836	100.0	$31.93

cent would represent a deduction of $4.30 and selling expense a deduction of about $.60; thus the net price of $38.45 would be reduced to $33.55.[1] The final figure is approximately equal to the true modal cost (about $33.95), and is much lower than the bulk-line cost. But this is easily explained, as conditions in the industry were abnormal in that year; the average return on investment was only about 6 per cent. Prices were abnormally low. In 1916 the average investment per ton (first half) was $70; when therefore an interest charge of $3.50 and a selling expense of $.60 was deducted from price, there was left $35.30. This figure is higher than the modal cost and approximates the bulk-line position, altho a little below it. Even in this year, the industry earned only about 8 per cent on its invested capital.

The same situation prevailed in this industry that prevailed in the bookprint paper industry. The high prices in 1917, which prompted the Commission's investigations, may have been due in part to the low prices of 1915. It has been explained that in 1915 the average return on investment was about 6 per cent, whereas in 1916 it was about 8 per cent.

It is interesting to consider the prices of newsprint paper in 1913 and 1914, altho an estimate of proper interest charges is not easy to make. If $3.00 or $4.00 be subtracted from the average net price in 1913 ($39.50) and from that in 1914 ($38.76), the resulting figures will be even less than the modal costs in both years (somewhere between the modes and the arithmetic averages). In these years the bulk-line costs corresponded rather closely to the modal costs, and the rate of return on investment was apparently small.[2] The curves for 1913 and 1914 are noticeably asymmetrical, as considerable quantities were produced at the lowest costs.

[1] See p. 105, Table 26.

[2] See profits in Table 26, p. 105: 1913, $5.53; 1914, $4.94; 1915, $4.59; 1916, $6.75.

Canned Salmon Costs and Prices

The costs of producing a full case of canned salmon in 1916 and 1917 are as follows:

Range in cost per full case	1916 Number of full cases	1917 Number of full cases	Range in cost per full case	1916 Number of full cases	1917 Number of full cases
$1.50–$2.00	64,387	53,965	$10.50–$11.00	24,624	15,358
2.00– 2.50	402,895	....	11.00– 11.50	8,495	....
2.50– 3.00	1,377,603	483,466	11.50– 12.00	5,842	27,170
3.00– 3.50	814,279	1,304,415	12.00– 12.50	7,860	4,488
3.50– 4.00	993,283	1,133,893	12.50– 13.00	....	6,709
4.00– 4.50	788,314	1,095,815	13.00– 13.50	....	1,635
4.50– 5.00	377,270	794,158	13.50– 14.00	....	....
5.00– 5.50	125,573	541,411	14.00– 14.50	....	....
5.50– 6.00	100,770	625,873	14.50– 15.00	....	....
6.00– 6.50	27,010	306,615	15.00– 15.50	....	....
6.50– 7.00	22,291	298,373	15.50– 16.00	....	....
7.00– 7.50	166,304	383,602	16.00– 16.50	....	21,853
7.50– 8.00	48,430	158,687	16.50– 17.00	....	....
8.00– 8.50	1,288	164,675	17.00– 17.50	....	21
8.50– 9.00	4,322	14,101	17.50– 18.00	....	....
9.00– 9.50	....	112,123	18.00– 18.50	....	2,489
9.50–10.00	....	20,467	18.50– 19.00	....	1,393
10.00–10.50	....	133,158	19.00– 26.50	....	3,574

The difficulty in comparing the average price of canned salmon with the costs arises from the differences in grades. Even in any one kind of salmon there are different grades of meat, which bring different prices when canned; and salmon from different sections bring different prices. A small amount of very fine or very expensive canned salmon, such as might bring a high price, would not affect the average price materially; but it would apparently have a great effect on the marginal cost. Thus, the average price in 1916 was $4.90, very much nearer the averages than the higher costs. In 1917 the average price ($7.28) moved higher on the

cost curve, but prices of salmon in 1917 were abnormally high. In this industry the interest on investment was probably about $.15 to $.20 per case in 1916 and 1917.[1]

In order to get figures of any value the cost of producing a certain grade should be compared with the price of that grade. As the Commission's report gives the best figures for the grade "red," these will be analyzed.[2]

1916		1917	
Range in cost	Red	Range in cost	Red
$1.50 – $1.99	.....	$2.00 – $2.49	.....
2.00 – 2.49	6,591	2.50 – 2.99	10,972
2.50 – 2.99	95,171	3.00 – 3.49	268,265
3.00 – 3.49	158,392	3.50 – 3.99	367,364
3.50 – 3.99	767,887	4.00 – 4.49	486,634
4.00 – 4.49	258,382	4.50 – 4.99	422,943
4.50 – 4.99	91,567	5.00 – 5.49	202,688
5.00 – 5.49	33,933	5.50 – 5.99	85,717
5.50 – 5.99	.....	6.00 – 6.49	120,802
6.00 – 6.49	.....	6.50 – 6.99	20,502
6.50 – 6.99	2,347	7.00 – 7.49	114,082
7.00 – 7.49	5,032	7.50 – 7.99	32,104
7.50 – 7.99	11,816	8.00 – 8.49	27,725
8.00 – 8.49	.....	8.50 – 8.99	.....
8.50 – 8.99	4,322	9.00 – 9.49	35,666
Over 9.00	.....	9.50 – 9.99	.....
		10.00 – 10.49	8,445
		Over 10.50	33,834

These figures are presented graphically on Charts VIII and IX.

In 1916 the opening price of "red" was $6.00 per case for most companies; some companies asked $6.40. The opening price can be taken as the approximate average gross price. Unless the investment per case was

[1] Average investment per case in 1916 was $4.97 and ranged from $2.49 to $7.91. Average investment per case in 1917 was about $4.31 and ranged from $2.70 to $9.00 per case.

[2] Report, p. 43, Table 16.

very different for this grade than for all other grades, only \$.15 or \$.20 need be deducted for interest and about \$.30 for selling expense. Deductions for cash discounts and other allowances cannot be estimated. The modal cost was about \$3.80; the bulk-line cost was probably about \$5.25. Some salmon was produced at higher costs, but these seem sporadic and unusual. Profits in this year were abnormal as the average return on investment was 22 per cent.[1]

In 1917 the opening price was \$9.40 per case for most companies; some companies asked \$10.00. After deducting the same interest charges (\$.15 or \$.20), and the same selling expense of \$.30, and estimating allowances to be deducted in order to arrive at net price, the net price minus interest will be approximately equal to the highest costs. The modal cost was only \$4.22 in this year. The price of salmon in 1917 was abnormally high, and was not well adjusted to cost. The average return in investment was 52 per cent.[2]

The Costs and Prices of Sugar Beets

The costs of growing sugar beets (per ton) in three districts in 1913 are given in the table on page 284.

These figures are presented graphically on Charts X, XI, and XII.

It is impossible to determine the investment (per ton) from the Commission's report. It can probably be assumed that the interest on the investment was approximately \$1.00 per ton. This figure applies better to California than to the other districts.

In the Ohio-Indiana district the average net price was about \$5.26 per ton. The highest cost group in this district ranged between \$5.20 and \$5.60. If the deduction

[1] Report, p. 61, Table 28. [2] Ibid., p. 61, Table 28.

Ohio-Indiana District		California District (*cont.*)	
Range in cost (per ton)	Tons produced	Range in cost (per ton)	Tons produced
$2.4 –$2.8	708	$6.7 –$6.9	.....
2.8 – 3.2	1402	6.9 – 7.1	.....
3.2 – 3.6	913	7.1 – 7.3	.....
3.6 – 4.0	995	7.3 – 7.5	.....
4.0 – 4.4	635	7.5 – 7.7	.....
4.4 – 4.8	312	7.7 – 7.9	.....
4.8 – 5.2	205	7.9 – 8.1	.....
5.2 – 5.6	11	8.1 – 8.3	1,100.00

California District		Michigan (lower peninsular) District	
$1.7 –$1.9	3,161.70		
1.9 – 2.1	11,877.68	$2.4 –$2.8	1,721.18
2.1 – 2.3	1,088.00	2.8 – 3.2	1,629.10
2.3 – 2.5	5,435.20	3.2 – 3.6	2,202.99
2.5 – 2.7	2,816.00	3.6 – 4.0	2,391.10
2.7 – 2.9	7,962.50	4.0 – 4.4	1,426.75
2.9 – 3.1	13,955.05	4.4 – 4.8	1,534.42
3.1 – 3.3	4,266.50	4.8 – 5.2	1,793.42
3.3 – 3.5	24,790.44	5.2 – 5.6	770.20
3.5 – 3.7	2,780.00	5.6 – 6.0	69.51
3.7 – 3.9	770.00	6.0 – 6.4	342.10
3.9 – 4.1	.....	6.4 – 6.8	196.00
4.1 – 4.3	636.30	6.8 – 7.2	13.28
4.3 – 4.5	6,944.00	7.2 – 7.6	.....
4.5 – 4.7	959.00	7.6 – 8.0	.....
4.7 – 4.9	.....	8.0 – 8.4	48.08
4.9 – 5.1	2,960.00	8.4 – 8.8	.....
5.1 – 5.3	572.50	8.8 – 9.2	10.38
5.3 – 5.5	.....	9.2 – 9.6	13.38
5.5 – 5.7	.....	9.6 –10.0	....
5.7 – 5.8	.....	10.0 –10.4	61.66
5.9 – 6.1	200.00	10.4 –10.8	.....
6.1 – 6.3	.....	10.8 –11.2	.....
6.3 – 6.5	.....	11.2 –11.6	21.84
6.5 – 6.7	.....	11.6 –12.0	38.20

for interest be made, it will be clear that the average price in this district was far below the highest cost and approximated the bulk-line position. The average cost was only $3.50, a little higher than the modal cost.

In the Michigan district the average net price was

$5.54 per ton. Altho the costs above $7.20 per ton may be considered sporadic, price did not conform to the higher marginal costs in this district, after making allowance for interest. Moreover, price was not much above the modal cost, which was about $3.58.

In the California district the price ($6.01) was higher than the marginal costs (not the highest costs) even when interest on the investment, which is probably somewhat larger in California, is taken into consideration. The modal cost was about $3.42.

It should be noted that the reason for the Commission's investigation was the alleged low prices paid farmers for sugar beets. The Commission's investigators, however, did not believe that the truth of this contention was established by the investigation. No average return on investment for these sections was published in the report.

The Costs and Prices of Copper

The costs of producing copper in 1918, as determined by the Federal Trade Commission, were as follows:[1]

	No. of est.	Pounds produced	Per cent of total	Average cost per lb.	Average selling price per lb.	Average investment per lb.
Cost less than 15 cents	6	424,340,257	33.84	12.630	24.357	22.428
" 15 to 17½ cents	7	395,672,390	31.56	16.284	24.430	33.278
" 17½ " 20 cents	8	169,578,109	13.53	18.078	25.073	31.453
" 20 " 21 "	5	36,871,193	2.94	20.477	23.664	40.419
" 21 " 22 "	5	91,812,263	7.32	21.605	23.108	36.412
" 22 " 24 "	7	90,111,068	7.19	22.090	24.207	29.998
" 24 " 28 "	8	33,955,962	2.71	26.273	24.455	20.961
" over 28 cents	7	11,426,343	.91	35.989	24.172	93.629
Total and average	53	1,253,767,585	100.00	16.700	24.388	29.779

[1] See Cost Reports of Federal Trade Commission, Copper, June 30, 1919.

These figures are presented graphically on Chart VII.

The average selling prices realized by the producers in the different cost groups varied somewhat; but the average selling price for all the companies was 24.388 cents. The bulk-line companies received approximately 24 cents for their product. The government fixed the price of copper at 23½ cents a pound, effective September 21, 1917, and this price prevailed until July 2, 1918, when it was put at 26 cents and remained so for the balance of the year.

The investment also varied for the different companies, but the investment of the bulk-line producers was probably somewhere between 20 and 30 cents. Interest at 5 per cent would be about 1 cent or 1½ cents. If this interest deduction be subtracted from the price, the result would be anywhere from 22.5 cents to 23.5 cents. The bulk-line cost seems to be between 19 and 23 cents. Thus price was even above the marginal costs. This is explained by the fact that the industry averaged more than 25 per cent on its investment.

Conclusions

The deductions to be drawn from the material here presented are only tentative. Cost groups of this kind should be so presented in the future as to enable investigators to identify (if only by number) the different producers represented, and particularly those at the bulk line. The investment for each group of producers should be indicated, as in the copper figures shown above. More data must be available before final conclusions can be presented. During the war the Federal Trade Commission obtained costs for a number of industries. These are being published, but are not entirely suitable for the present purpose because the prices for the industries represented were not competitively deter-

mined but fixed by the various price-fixing agencies, and for the further reason that investment figures are not usually given. If the conclusions to be set forth in the next paragraph are not borne out by further investigation, all that the writer can claim as the *raison d'être* of this paper is the method of inquiry which it sets forth.

From the figures presented it appears that, if the average return on investment is an index of normality, in no case were the industries represented operating under absolutely normal conditions of competition. However, in those years which were more nearly normal, price was in practically every case considerably above the modal or average cost and approximated, generally speaking, the bulk-line position. This was as true of the manufacturing as of the extractive industries, and as true of the smaller dispersion group as of the larger dispersion group. Bookprint paper in 1916 is the one case where, even with a high return on investment, the price was not much above the marginal or bulk-line cost. This may be explained by the small degree of dispersion for the costs of the industry in that year. More data may bear out the contention that the price-cost relation is affected by the degree of dispersion of the costs. Until such data are procurable, the generalization to be drawn from these analyses is as follows. Price approximates bulk-line or marginal cost under normal conditions of competition, i. e., when the total gross profits (including interest and profit) of all the producers in an industry amount to approximately 10 per cent of the entire capital invested in the industry; and price is higher or lower than bulk-line cost whenever the return is greater or less than approximately 10 per cent.

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THE RAILROADS UNDER GOVERNMENT OPERATION. I. THE PERIOD TO THE CLOSE OF 1918[1]

SUMMARY

Events preceding federal control, 290. — Decline in net income, 291. — Roads unprepared for the traffic of 1915, 293. — Voluntary unification through Railroads' War Board, 293. — Results not satisfactory, 297. — Railroads taken by the government, 300. — Reasons for federal control, 301. — Organization under federal control, 303. — Contract between Director General and railroad companies, 306. — The first period: unification and standardization, 309. — Joint use of terminals and other facilities, 310. — Utilization of motive power, 313. — Joint use of freight cars, 313. — Freight in solid train lots, 314. — Disregard of shippers' designation of routes, 314. — Diversion of exports to southern ports, 315. — Consolidation of ticket offices, 315. — Standardization of locomotives and cars, 316. — Simplification of accounting, 319. — Standardization of operating statistics, 321. — Reductions in passenger train service, 323. — "Sailing day plan" for less than car load freight, 326. — Abolition of "off-line" freight agencies, 327. — Increases in rates, 327. — Adjustment of complaints, 329. — Uniform classification, 329. — Labor problems and wage increases, 330. — Extent of freight congestion in December, 1917, 332. — Movement of foodstuffs for export, 332. — Bituminous coal situation, 333. — Movement of troops, 334. — Volume of tonnage moved in 1918, 335. — Operating results and operating efficiency; statistics, 336. — Financial results, 338.

THE years 1917–20 inclusive, will stand out as a critical period in the history of American railroads. These short three years were marked by as many fundamental changes in railroad administration. First came the voluntary unification of all railroads and the attempt on the part of individual roads to act together in the war emergency as one system, under the direction of

[1] The writer of this article was officially connected with the United States Railroad Administration from April, 1917, until September 15, 1919, first as manager of the Operating Statistics Section, and later as assistant director of Operation.

a Railroads' War Board invested with power to suspend and disregard individual and competitive interests. This voluntary unification lasted from April 11, 1917, to December 28, 1917, or almost nine months. The second change was the compulsory unification of all railroads under federal control, lasting twenty-six months (until February 29, 1920). The third came with the passage of the Transportation Act of 1920, which restored the railroads to private management and fundamentally modified the policy of public regulation.

From March 1, 1920, railroad administration has entered upon a new era. We are now observing with keen interest the workings of the new policy of regulation, and are wondering whether the results in the immediate future will justify the action of our law makers in giving constructive effect to an overwhelming public opinion in favor of the restoration of private management and a more liberal policy of regulating earnings, or whether it will mark the final downfall of private management and the permanent adoption of some form of governmental operation or ownership. The traditional American policy of relying upon competition and private initiative to serve public interests in railroad management is on trial for its life. Whether it will be condemned, or vindicated and acquitted, depends upon the degree of success which attaches to the results under the provisions of the Transportation Act.

It is the purpose of this and a second article (1) to review the events which preceded the President's proclamation taking possession of the railroads; (2) to review the policies and results of the first year of federal control, during which American participation in the world war was at its height; (3) to discuss the policies and results of federal control during its second year or the first part of the reconstruction period; and (4) to

comment upon the present situation and the outlook for the future. The present article will deal with events up to December 31, 1918.

Events Preceding Federal Control

Critics of private railroad management state that the railroads "broke down" in 1917, just at the time when transportation efficiency was most vitally necessary. If it is true that the railroads failed in the emergency, we are as much interested in the causes of the failure as in the failure itself. To get at the causes it is necessary to trace the events of the decade preceding the period of the war.

Until a few years prior to our entrance into the war, it had been the traditional policy of the typical American railroad to keep its equipment and facilities well ahead of the demands of growing traffic. The cost of additional or improved equipment, and of additional or enlarged terminals, trackage, and other physical facilities, was met either from current income or from the sale of new securities. As a result of this policy, the typical railroad was always equipped to handle its growing business economically. There was an ample factor of safety, so that the ever-increasing volume of tonnage and passengers could be handled expeditiously and without congestion.

The ability to continue this policy depended, of course, upon net earnings sufficient to insure ample credit. So long as net earnings justified appropriations for improvements, or were sufficient to assure the investor in new securities, there was no difficulty in keeping pace with expanding traffic. In most cases the earnings from the additional traffic sufficed to pay a reasonable return upon the additional investment. The law of

increasing returns had its full application as the improvements or enlargements in equipment and facilities made it possible, with the larger traffic, to operate at lower unit costs. These lower unit costs enabled the railroads to absorb the gradually increasing wage rates or other additional operating expenses and taxes, and because investors had confidence in railroad securities they were easily marketable.

This situation continued as long as net earnings were sufficient. But the gradual tendency of higher operating costs, coupled with a national and state policy of regulation which tended to reduce rather than to increase rates, soon had the effect of reducing net income. The turning point came about 1906, or coincident with the passage of the Hepburn Act amending the Interstate Commerce Act. This amendment, with its power of suspension, gave the Commission complete control over rates. The period, too, was marked by unusual activity on the part of state commissions and state legislatures. Many new laws were passed, nearly all of which either reduced revenues or increased expenses. The difficulty was aggravated by a conflict of regulating laws as between the states themselves, and as between the states and the Interstate Commission. Coupled with these adverse influences on net earnings came greater activity on the part of the railroad labor organizations in their demands for higher wages. While the steadily growing burdens of increased operating expenses and taxes impinged upon and forced net income downward, the railroads were unable to convince the government regulating authorities that rates should be increased in a degree which would maintain net income. Consequently it became difficult to appropriate money for betterments, and during the decade which preceded our entrance into the world war the program of

extensions, enlargements, and improvements was far below the normal rate of earlier years. Not only were the railroads as a whole unable to raise the funds necessary to equip themselves for prospective increases in traffic, but many were in such financial straits that they found themselves unable to maintain their solvency. The year 1915 marked the peak of railroad receiverships. In that year approximately 42,000 miles, or about one-sixth of the entire railroad mileage of the country was in the hands of the courts.[1] New construction had practically ceased. The mileage of new railroad built in that year was less than in any year since the period of the Civil War. Orders for new locomotives and cars dropped to an unprecedented low level, and drastic retrenchment and curtailment in service were everywhere in evidence.

The spokesmen of the railroads made earnest and continued appeals in an effort to arouse the interest of the public and, through the public, the interest of the governmental regulating authorities in the seriousness of the railroad situation. Among these spokesmen none presented the railroad case with more vigor or with more vision than the late James J. Hill. For several years before the world war he foresaw the ultimate effect of the slowing down of railroad development, and he sounded a note of warning, predicting that national embarrassment would come. He plead for a policy of regulation which would make it possible to invest one billion dollars annually in railroad facilities, particularly in terminals. But the warning and the plea were not needed. The railroads were able to spend but a fraction of the sum which he regarded as necessary. Consequently the natural increase in traffic (ton miles double about every twelve years) soon overtook and exceeded

[1] Railway Age Gazette, October 1, 1915.

the capacity of the railroads to give satisfactory service. The point of traffic saturation was reached.

This was the situation in 1915, when the flood of extra traffic incident to the great war broke upon the railroads. They were not prepared for the overload, but met the emergency with resourcefulness. The year 1916 brought a further increase in traffic as the orders for war materials to be shipped abroad grew in volume. Then came our declaration of war against the Central Powers in April, 1917, and with it the mobilization of the army and navy, the construction of cantonments, the beginning of the ship building and aircraft programs, and the large scale production of ammunition and supplies of all kinds for our fighting forces.

Having in mind the fundamental fact that during the ten years immediately preceding the date of our participation in the world war the railroads of the country had been unable to earn net income sufficient for them to maintain their credit and to attract new capital for needed enlargements and improvements in facilities, and that the abnormal traffic incident to war conditions was so great as to exceed the capacity of their lines and terminals, it was inevitable that congestions and delays should occur. Such a result, particularly on the lines serving the eastern seaboard, where most of the additional traffic centered, could not be avoided.

The Railroads' War Board

The gravity of the situation was fully realized by the railroad executives, and when we entered the war they acted quickly in an effort to meet the emergency. It will be recalled that in 1914, almost immediately after England declared war against Germany, the British government took over the railroads and operated them

through a board consisting of the general managers of the principal railroads. When the United States became associated with the Allies, a move similar to that taken by the British government was anticipated by our railroad executives, but they decided to take the initiative themselves. Within five days after our declaration of war against Germany the Railroads' War Board was organized under a resolution signed by the chief executive of practically every railroad in the United States. The resolution bound the railroads individually to coördinate their operations during the war within a continental railroad system, "merging during such period all their merely individual and competitive activities in the effort to produce a maximum of transportation efficiency." While the controlling motive was one of patriotic endeavor to make the railroads the greatest possible aid to the government in prosecuting the war, there was undoubtedly a desire on the part of many railroad executives to demonstrate to the public that American railroad men under private ownership and control of railroads could do their part without formal government action like that taken in England. Such a demonstration, if successful, would curb the activities of the growing number of people who then looked with favor upon government ownership as the ultimate solution of the railroad problem, and who advocated the immediate taking of the railroads as a war measure.

By the terms of the agreement, which was brought about by a special committee of the American Railway Association (the details of the plan had been worked out before we declared war), the operations of all railroads as a continental system were to be directed by the executive committee of the Railroads' War Board, to whom the chief executive of each railroad company had

formally delegated authority to merge competitive activities and to make common use of facilities and equipment. The activities of the Railroads' War Board were tied into the activities of the Council of National Defense by a member of the Council who became *ex officio* a member of the War Board, and were similarly coördinated with the work of the Interstate Commerce Commission through one of the Commissioners. The two *ex officio* members participated in the deliberations of the Railroads' War Board and in the shaping of its policies. There was also active and continuous coöperation between the Railroads' War Board and the army and navy, and the Food and Fuel Administrations, and points of contact were established with practically all other governmental agencies.

Each railroad individually was operated by its chief executive under instructions from the executive committee of the Board. Outside of freight car utilization and troop movements, an excess of centralized control of detail was avoided. The executive committee exercised its control through regional committees, the chairmen of which, with the executive committee and the *ex officio* members, made up the complete Board. These regional chairmen exercised jurisdiction in territories which corresponded with the five army departments, namely, the Northeastern, the Eastern, the Southeastern, the Central, and the Western districts with their respective chairmen for the Railroads' War Board and generals in charge of the army departments. At each army headquarters and at each cantonment camp or mobilization point a representative of the Railroad Board was stationed to insure prompt and effective coöperation between the army authorities and the railroads, and during the months from July to December, 1917, the railroad transportation needs of the army were met in a man-

ner which brought nothing but praise from the army authorities.[1]

While the first energies of the Railroad Board were devoted to satisfying the demands of the army and navy, efforts were made to take care of the needs of other branches of the government, and to impose the minimum of hardship upon the civilian population. The executive committee, the regional chairmen, and the several sub-committees of the Board did their best to bring about complete unification of facilities and equipment and to eliminate the "merely individual and competitive activities." Much of merit was accomplished by the Commission on Car Service in its efforts "to make one freight car do the work of two." Considerable progress was made in bringing about the joint use of terminals and running tracks, in reducing the volume of traffic moving via circuitous routes, and in curtailing superfluous passenger trains established for competitive reasons.[2] The statistical records of April to December, 1917 show commendable improvements in the efficient utilization of locomotives and freight cars, and the inconvenience to the civilian travelers was much less than that which was imposed in England.

[1] In his annual report for 1917, Secretary of War Baker made this reference to railroad coöperation:

"In this general connection it seems appropriate to refer to the effective coöperation between the department and the transportation agencies of the country. For a number of years the Quartermaster General's Department has maintained close relations with the executives of the great railway systems of the country. In February, 1917 a special committee of the American Railway Association was appointed to deal with questions of national defense, and the coöperation between this committee and the department has been most cordial and effective, and but for some such arrangement the great transportation problem would have been insoluble. I am happy, therefore, to join the Quartermaster General in pointing out the extraordinary service rendered by the transportation agencies of the country, and I concur also in his statement that of those who are now serving the nation in this time of stress, there are none who are doing so more wholeheartedly, unselfishly and efficiently than the railroad officials who are engaged in this patriotic work."

[2] The reduction in passenger service was mainly on the roads east of Chicago. Relatively little was done on the transcontinental lines. The failure to act may be traced to the influence of competition.

Yet the results as a whole were not satisfactory. Freight congestions began to occur on the lines serving the Atlantic seaboard. Yards, sidings, and even running tracks were clogged with cars. The freight service as a whole on the lines between Chicago, Pittsburg, and the Atlantic ports was badly demoralized during the last three months of 1917.

One reason for these congestions is found in the failure of the railroads to keep up their programs of enlargement and improvement, and to maintain their usual scale of additions to the equipment of locomotives and freight cars. The small factor of safety that remained in 1917 was exceeded, and the flow of traffic at strategic points was impeded. It is an axiom of transportation that the capacity of a road as a whole is limited by the capacity at strategic points. The "neck of the bottle" may be the receiving or final terminals, it may be the intermediate yards, it may be the engine terminals, it may be the supply or the condition of locomotives, it may be the number of experienced train crews, or it may be the capacity of the management to cope with new problems. In this case the principal difficulties were found in the terminals at Pittsburg, Baltimore, Philadelphia, and New York. The great bulk of the additional war traffic from other sections of the country was required to move through those terminals and the railroads had also to supply the raw materials to and take the finished products from the many manufacturing plants in Pennsylvania, Delaware, New Jersey, New York, and the New England states.

The failure to control the flow of export traffic was the second cause of the congestion. Freight for export was accepted without regard to the capacity of the available ships. Part of the war materials for the Allies was ordered from American manufacturers under con-

tracts which provided that a large percentage of the invoice would be paid as soon as the materials were loaded on cars.[1] The profits on these contracts were large. The traffic departments of the railroads were eager to get the tonnage. There was, therefore, every inducement to load the materials into the cars at the earliest possible moment. The result was that the export tonnage on the rails very much exceeded the capacity of the ships, and the cars containing the excess were held for months at a time. If something like the permit system which was adopted later by the United States Railroad Administration had been put into effect, or if the Railroads' War Board had been able to curb the spirit of competition which apparently blinded the traffic and executive departments of the railroads to the obvious consequences, the flow of this traffic might have been controlled at the source and the crisis might have been avoided. As the trouble developed at the seaports the cars backed up and filled the intermediate yards. Then it affected the large producing centers at and east of Pittsburg. Then it backed up to Chicago and the Mississippi River points. Freight cars held weeks and months under load were not released in time to be returned for new loads, and a car shortage resulted. Efforts to pick out certain cars from the accumulation added to the delay and confusion.

The original Act to Regulate Commerce (1886) provided that the railroads, in time of war, should give preference and precedence over all other traffic to the movement of troops and materials of war, and should adopt every means within their control to facilitate and expedite military traffic. Under this authority each branch of the government insisted upon priority in the

[1] This applied particularly on materials for Russia. The breakdown in that country left vast stores of materials on cars at both the Atlantic and the Pacific seaports.

movement of its freight, but there was no effective agency for coördinating these demands. As the government freight made up such a large part of the total traffic of the eastern roads, and as nearly every department pressed for special priority for its cars, the situation became one of demoralization. It was stated that on one day in the latter part of 1917 a count of the eastward-bound loaded cars on the Pennsylvania Railroad east of Pittsburg indicated that something like 80 per cent were marked for priority. Here was a third reason for the transportation crisis.

Still another important factor, already referred to in connection with the export situation, was the failure of the Railroads' War Board to put an effective curb on competitive influences. This was but natural. Railroad officials had been brought up in an atmosphere of competition, and our national policy of regulation is predicated upon unhampered competition. The anti-pooling and the anti-trust laws are examples of legislation for enforcing competition. In fact, there was some fear that the Attorney General might question the legality of the Railroads' War Board, and there was uncertainty as to how long it would continue to function. A railroad executive with a jealous regard for the interests of his stockholders had some justification for hesitating to give up something which might permanently benefit a natural rival and permanently affect the value of his property. These incidents in the main attached to traffic relations; they had little bearing upon the strictly operating features.

Federal Control

By December, 1917 the railroad situation had become acute; there was much conjecture as to what would be done. The uncertainty was dissolved by the President's proclamation of December 26th. Acting under the authority granted to him by the Army Appropriation Act of August 29, 1916,[1] the President took possession of the railroads of the country as a war measure, from December 28, 1917, and appointed William G. McAdoo, Secretary of the Treasury, as Director General of Railroads.

The President's proclamation and his letter to Congress intimate that the impelling motive for federal control was one of finance. "Complete unity of administration in the present circumstances involves upon occasions and at many points a serious dislocation of earnings, and the committee (the Railroads' War Board) was, of course, without power or authority to rearrange charges or effect proper compensations and adjustments of earnings. Several roads which were willingly and with admirable public spirit accepting the orders of the committee have already suffered from these circumstances and should not be required to suffer further." The tenseness of the labor situation was another ground for the federalization of railroads. The high wages paid in the shipbuilding yards, in munition plants, and in other work on war supplies, and the sharp advances in the cost of living, had caused much unrest among railroad workers. While the railroad executives were deliberating, there were threats of strikes, and the

[1] This section of the Act was probably intended to provide for any emergency which might arise in connection with Mexico in 1916. At the time of its passage there was little thought of our entering the world war.

situation during the latter part of 1917, just preceding federal control, was exceedingly acute.

But, with all the emphasis placed upon matters of finance and their effect upon the pressing problems of enlargement, upon labor unrest, and upon the coördination of facilities, other reasons were in the background. One of the great obstacles to complete coördination of facilities under voluntary agreement among the railroads was law-made rather than railroad-made. The things which the United States Railroad Administration at once set about to do were the very things that the railroads as private corporations were forbidden to do by the anti-trust and anti-pooling laws. What the Railroads' War Board had done in voluntary unification was directly contrary to those laws, and the executives knew that they might be held personally liable. There were no informal "understandings" that under the emergency conditions the Department of Justice would overlook the situation. On the contrary, there were positive indications by official inquiries that the Attorney General was keeping himself informed of every move. The laws obliged railroads to compete; they prohibited the pooling of facilities and earnings. Under the war conditions the maximum of transportation production depended to a large extent upon effective coördination, which required the pooling of resources. This phase of the situation undoubtedly had weight in the government's decision to take over the railroads.[1]

The President's proclamation of December 26, 1917 directed Mr. McAdoo, as Director General of Railroads, to take possession of and control, operate, and utilize "each and every system of transportation and appurtenances thereof," and to "perform the duties

[1] The Federal Control Act provided for the war-time suspension of the anti-trust and the anti-pooling laws as applied to railroads.

imposed upon him through the boards of directors, receivers, officers, and employees of said systems of transportation. Until and except so far as said director shall from time to time by general or special orders otherwise provide, the boards of directors, receivers, officers, and employees of the various transportation systems shall continue the operation thereof in the usual and ordinary course of the business of common carriers, in the names of their respective companies." The Director General's first general order accordingly directed that "all officers, agents, and employees . . . may continue in the performance of their present regular duties, reporting to the same officers as heretofore and on the same terms of employment."

Under this order the president of a railroad company acted as agent of the Director General and at the same time continued as the chief executive of the corporation — a form of organization which was continued until after the passage of the Federal Control Act, approved March 21, 1918. That Act provided the terms of compensation to the corporations and otherwise established the relations between the Director General as the lessee of the railroads and the individual companies as lessors.

Immediately after the passage of the Control Act an attempt was made to draw a fairly sharp line between railroad activities which were purely corporate and those which were federal. For example, on March 30, 1918, Circular No. 17 outlined a policy under which the salaries and expenses of officers and employees engaged primarily in work for the corporation would be paid from corporate funds, if the corporation desired to continue their services, and under which the government would pay the salaries and expenses of such officers and employees only as were necessary for the federal operation of railroads. This circular was aimed at such

corporate officers as chairmen of the Board, general counsel, and executive financial officers such as the New York corporate organizations of western and southern railroads.

This action was followed on May 21 by a fundamental change in organization. Instead of continuing the chief executive of a railroad company as the agent of the government, the Director General ordered that there should be a distinct cleavage between federal and corporate activities. To that end he required that a federal manager, to act for the Director General, should be appointed for each railroad or for each group of railroads in the cases where some of the small roads were operated as parts of larger systems.[1] Federal managers were obliged to sever all connection with the railroad companies. They were to represent the government exclusively. In most cases the president or the operating vice president was chosen as federal manager. Thereafter there were two sets of officers and employees. The first, the federal organization, included as its principal officers a federal manager (on a few of the larger systems there was also a general manager), a federal auditor, a federal treasurer, a federal counsel, and other officers necessary under governmental operation. The second set of officers looked out for corporate interests and consisted of a president, secretary, corporate auditor, corporate treasurer, and others necessary to serve the interests of the company while the roads were under federal control. This action, designed to remove the possibility of conflict of interest and of loss to the government by the former plan of dual responsibility, was precipitated by a few cases in which the Director General did not receive the measure of support which he believed was necessary.

[1] The federal manager of the Baltimore & Ohio Railroad, for example, had charge also of the Western Maryland and the Cumberland Valley Railroads.

In announcing the new policy Mr. McAdoo said:

> Inasmuch as "no man can serve two masters," and the efficient operation of the railroads for winning the war and the service to the public is the purpose of federal control, it was manifestly wise to release the presidents and other officers of the railroad companies, with whose corporate interest they are properly concerned, from all responsibility for the operation of their properties. . . . All ambiguity of obligation is thus avoided. Officers of the corporation are left free to protect the interests of their owners, stockholders, and creditors, and the regional and operating managers have a direct and undivided responsibility and allegiance to the United States Railroad Administration.

Mr. McAdoo asserted that the government saved large sums by the change and much publicity was given to the "fancy salaries" paid railroad presidents and others who were by this action transferred to the corporate pay rolls and paid from corporate funds, or who, as federal managers, were paid lower salaries. The majority of the officers who accepted the higher positions in the regional and central organizations received smaller salaries than they had received as officers of railroad companies, but the number was not as large among federal managers. A very few of them were benefited financially.[1]

With this change in the relations between the Director General and the companies, the organization of the United States Railroad Administration assumed the form which continued without substantial alteration during the entire period of federal control.[2] The unit of

[1] "Under private control of the railroads 2,325 officers drawing salaries of $5,000 a year or over were employed, with aggregate salaries of $21,320,187. Under government control 1,925 officers (a reduction of 400) are doing the same work, and the aggregate of their salaries is $16,705,298 — a saving of $4,614,889 per annum. This total includes the officers of the various regional districts as well as those of the central administration in Washington." (Report to the President by the Director General of Railroads, for seven months ending July 31, 1918.) This phase of government operation will be discussed further in the second article.

[2] In a general way the organization has already been described in these columns. See a note by Mr. Brice Clagett in this Journal, vol. xxxiii, p. 188, November, 1918.

organization was the federal manager of a road or a small group of roads. The country was divided into seven regions — Eastern, Allegheny, Pocahontas, Southern, Northwestern, Central Western, and Southwestern. Each region was in charge of a regional director, assisted in some cases by district directors. The regional directors had control over all activities within their respective regions, but in functional matters their work was coördinated by the several directors of the central administration.

An organization chart would show full lines of responsibility and authority between the regional directors and the Director General, with broken lines indicating advisory relations between the regional directors and the directors of the several divisions. But the procedure was never definitely understood, and at times there was confusion. In theory the regional directors, controlling the several federal managers, were intended to be supreme in their respective regions, and were to be responsible directly to the Director General. It was the intention that the central organization should work through the regional directors. In practice, however, there was much "short-cutting" between officers of the central administration and the federal managers, federal auditors, federal treasurers, and other officers subordinate to federal managers. There was some feeling on the part of the regional directors that they should not be held responsible for actions over which they had no direct control. Yet on the whole, considering the size of the organization [1] and the lack of time in which to work out and publish a *Manual of Organization* with a clear definition of authority and responsibility, the confusion was relatively small. Inasmuch as the

[1] Railroad officers and employees in federal control with those employed by the Pullman lines, express company, and water lines numbered approximately 2,000,000, or half as many men as were in the army and navy at the height of our military activity.

motives of practically every one in the official organization were in harmony with the controlling desire to operate the railroads at the highest pitch of efficiency for war purposes, it was just as well that the order of procedure was not so bound up by rigid rules as to substitute army "red tape" for a reasonable degree of personal initiative in short-cutting where the circumstances justified.

The Contract between the Government and the Railroad Companies

From the date of the passage of the Federal Control Act in March, 1918, until the latter part of October, a large part of the time of the Director General and his legal and other advisors was taken in framing a standard contract between the government and the companies. While this contract was based on the provisions of the Act, its terms were so hurriedly drawn that many complications were apparent when the attempt was made to express them in a formal contract. The negotiations were long drawn out and the contract as finally approved by Mr. McAdoo represents many compromises, most of them from the side of the committee representing the railroad companies. Considerable difficulty was experienced in coming to an agreement with many of the companies, so that up to January 1, 1919 contracts had been executed by but 23 of the 160 or more Class I railroads.[1] At the end of federal control 147 contracts had been executed and 83 were still under consideration. Of these, 49 had agreed with the Director General as to compensation, while 15 had declined to accept the compensation offered and had filed appli-

[1] Annual Report, 1918, Division of Law.

cations with referee boards to fix compensation. Six roads had declined to make contracts and seven had never made application therefor.[1]

The terms of the contract have been well summarized in these columns [2] by Professor Dixon and need not be discussed here. Reference will be made later to the question of maintenance and its relation to Section 5 of the contract.

The Two Periods of Federal Control

The twenty-six months of federal control may be divided into two distinct periods in which the conditions differed fundamentally. The first period was from January 1, 1918 to the signing of the armistice. During that period and until January 11, 1919, Mr. McAdoo was Director General. The second period was from the signing of the armistice until the end of federal control on February 29, 1920. During that time (except for the first two months) Mr. Walker D. Hines was Director General.

The first period was one of intensive military activity. The sole thought was to administer the railroads as an effective agency of the army and navy. Officers and employees were spurred by motives of patriotism. The public cheerfully accepted limited railroad service and cordially coöperated with the Administration in its efforts to produce the maximum of the kind of transportation most needed in the war. The fact that the railroads were functioning effectively and were breaking all records of transportation efficiency compensated the

[1] Report of Director General to the President for fourteen months ended March 1, 1920.

[2] Quarterly Journal of Economics, vol. xxxiii, p. 577, August, 1919, "Federal Operation of Railroads During the War."

shipping and the traveling public for their sacrifices, and encouraged railroad officers and employees to do their utmost. Wages had been raised substantially; the high cost of living was not yet as disturbing a factor as it became later; and the general morale of the service was fairly satisfactory.

Almost immediately after the signing of the armistice, there came a marked slackening. The spur of patriotism disappeared. The common motive to excel was lacking. The game was over. The war had been won. The minds of both officers and men turned to their personal interests.

Early in January, 1920 the first of the protracted hearings on the return of the railroads was held by the Senate Committee on Interstate Commerce. Then began a country-wide discussion of the railroad problem and the formulation of the many "plans" for its solution. To add to the confusion the lid was lifted from the cauldron of dissatisfaction on the part of shippers and travelers. With the conclusion of military activity there came an insistent demand for a resumption of pre-war service and pre-war shipping privileges. A natural reaction set in against governmental administration. The states began to assert their rights and the shippers' organizations became active in their criticism. An agitation was started to restore the rate-making power of the Interstate Commerce Commission and a Congressional bill designed to bring it about failed only because vetoed by the President.

Coupled with these disturbing factors, the cost of living continued to mount. Railroad employees had expected prices to drop. The higher wage awards of the Railroad Administration were found to have less purchasing power than the pre-war wages. The spirit of unrest found expression in insistent demands for further

wage increases. The appeal of patriotism could no longer be invoked, and the general feeling of discontent with economic conditions in all lines of business seriously undermined the morale of railroad service.

The First Period. Unification and Standardization

Observing the distinction between the characteristics of the first and the second year of federal control, attention will be directed first to a review of 1918, with particular reference to the methods adopted under the policy of unification and standardization. This policy was applied principally to the features of operation enumerated below:

Joint use of passenger and freight terminals.
Joint use of yards and engine houses.
Consolidation of car inspection forces.
Joint use of running tracks.
Joint use of motive power and cars.
Short-routing of freight.
Diversion of export traffic to southern ports.
Consolidatior of city ticket offices.
Abolition of off-line offices.
Elimination of competitive activities.
Standardization of new locomotives and cars.
Simplification of inter-road accounting.
Standardization of operating statistics.

The Railroads' War Board had made considerable progress in arranging for the joint use of terminals, other facilities, and equipment, but the United States Railroad Administration went much further. The attention of the regional directors was concentrated upon this feature of operation during the first few months of federal control and the Director General stressed it. The 1918 annual reports of the regional directors claim large savings in operating expenses by reason of unifica-

tion of facilities, but these estimates of economies must be accepted with reservations. In many cases the apparent savings at one point were partly offset by additional expenses elsewhere.[1] In many cases, too, they were made at the cost of much inconvenience to the shipping and traveling public. On the whole, however, there were real net savings and, what was more important, the capacity of the roads as a national system to produce ton-miles and passenger-miles was increased.

The example best known to the public was the joint use of the Pennsylvania New York City terminal by the passenger trains of the Pennsylvania, Baltimore & Ohio, and Lehigh Valley roads. Such common use of the new terminal was not contemplated when it was designed, but the plan proved to be feasible and it resulted in better service to the public. In freight service one of the best examples was in Chicago. Its terminal district embraces an area of about 2,500 square miles. It is served by 40 railroads which at that time were interchanging about 40,000 cars daily. Plans were worked out under federal control by which the Elgin, Joliet & Eastern Railroad was used more extensively as a connecting link between the eastern and the western trunk lines for the handling of through freight not requiring icing, while perishable freight was concentrated on the Indiana Harbor Belt Line. Industries on the St. Charles Air Line were formerly served by the separate switching locomotives and crews of 19 railroads. The new plan provided that the Illinois Central forces should do all of the work for itself and for the eastern lines (with the exception of the Michigan Central); and the Burlington

[1] The annual estimated savings through joint use of terminals, yards, and like facilities were estimated in 1918 as follows: Eastern region, $4,172,000; Allegheny region, $4,037,526; Pocahontas region, $1,495,603; Southern region, $2,182,260; Northwestern region, $4,888,993; Central Western region, $5,325,000; Southwestern region, $1,434,000; total, $23,535,382.

forces were to do all of the work for the western lines. Passenger trains of the Baltimore & Ohio and of the Pere Marquette between Pine Junction and Sixteenth Street were diverted to the Pennsylvania tracks in both directions, thus freeing the Baltimore & Ohio Chicago terminal of all passenger business with its retarding effect on the freight service, shortening the run of these passenger trains by 7 miles and their running time by 40 minutes.[1]

All of the regional directors in their 1918 annual reports gave imposing lists of instances of unification or consolidation of physical facilities. The Allegheny region alone reported 875 cases; the Southern, 140; and the Southwestern, 272. Most of these unifications were relatively unimportant individually but they included practically all of the important terminals throughout the country. The degree of unification, of course, had a wide range of difference, according to practicability. In some cases it was comprehensive; in other cases very slight. Where there were two or more engine houses of different corporate ownership it was found feasible in a few cases to close one or more of them and to concentrate the work in one. Such a plan worked well at Galveston. The separate car inspection forces maintained by the individual roads to protect their individual interests under private operation were consolidated into one joint force at a large number of interchange points. In some cases one freight station was used for the business of two or more roads and the stations from which the business was diverted were closed. At some points savings were made by having all of the switching service performed by one road where, under competitive conditions, separate switching service had been performed by all of the competing carriers.

[1] Railway Age, vol. 68, p. 78, January 2, 1920.

The same principle was applied to the joint use of running tracks where such action was advisable. For example, Baltimore & Ohio trains between McKeesport and New Castle were diverted over the tracks of the Pittsburg & Lake Erie and the Pennsylvania, where one locomotive could handle as many tons as five locomotives could handle between the same points on the Baltimore & Ohio. Coal and coke from the lower Connellsville region on the Baltimore & Ohio road were routed over the Monongahela, the Pittsburg & Lake Erie, and the Pennsylvania lines to the Pittsburg district, thus releasing the Baltimore & Ohio lines for eastward-bound traffic, principally coal from the Fairmont district to seaboard. Or again, traffic which formerly had moved from the Baltimore & Ohio lines in the West Virginia coal regions and the Pittsburg district via Baltimore and Philadelphia was routed via Rutherford and the Philadelphia & Reading road, thus keeping such traffic out of the congested districts at Baltimore.[1]

Between Pueblo and Denver, a distance of 118 miles, and between Wells, Nevada, and Winnemucca, Nevada, a distance of 185 miles, the single tracks of two separate railroads were operated as the double track of one railroad, thereby increasing their combined capacity.[2]

Between Oakland and San Francisco separate ferry services had been operated by the Southern Pacific, the Santa Fe, and the Western Pacific roads. As the ferry facilities of the Southern Pacific were ample to serve the traffic of the three roads, the passenger trains of the Santa Fe and of the Western Pacific were brought into the Oakland Mole, and their passengers used the ferries of the Southern Pacific.[3]

[1] 1918 Annual Report, Regional Director, Allegheny Region.
[2] Ibid., Division of Operation. [3] Ibid.

The utilization of motive power was made much more effective through unified control. Surplus power on one road or in one region was quickly transferred to another road or region where a shortage existed.[1] When the shop facilities of one road were inadequate, or were overtaxed by locomotives in need of repairs, some of these locomotives were taken to other roads with greater shop capacity and there repaired. Baltimore & Ohio locomotives, for example, were repaired in shops of roads in the Northwest region.

In the case of freight cars, which had practically been pooled under the operations of the Railroads' War Board, the pooling under federal control was made much more complete. During the greater part of federal control the payment of car hire (*per diem* charges) as between roads in federal control was waived, and each road was instructed, as regards running repairs or shop repairs, to give the same care to cars of other roads as it gave to its own cars.[2]

The Car Service Section had complete control over distribution, and shifted the cars to where they were most needed without regard to ownership. In the process of distribution of empties, the cars were often dispatched in solid train lots as, for example, when they were urgently needed in the West early in the spring of 1918 for the movement of food for export. These trains of empties were arbitrarily routed via the roads which could handle them most expeditiously and with the least interference with loaded car movement. The normal car service rules, which provide that the burden of the empty movement shall be assumed by the road or roads which received the revenue from the loaded movement,

[1] The practice of transferring locomotives from one road to another road had been inaugurated by the Railroads' War Board.

[2] This plan did not work satisfactorily. It will be discussed further in reviewing the results of 1919.

were set aside. This policy naturally resulted in a somewhat higher percentage of empty car miles to total car miles, but the loss was counterbalanced by a reduction in car shortage at the points where the traffic of vital importance originated.

Mention should here be made of the policy of dispatching solid trains of foodstuffs and other freight of similar character from the West intact to the seaboard. Tho this is not an economical method of transportation (because the maximum economical weight of the train varies with the rate of the grades and the power of the locomotive, and these differ widely on individual railroads) the practice did much to expedite the movement of freight then badly needed in France.

The first general order issued by the Director General (No. 1, December 29, 1917) directed that shippers' designation of routes should be disregarded when freight might be moved with greater expedition or more efficiently by other routes. It provided also that traffic agreements between carriers were not to be allowed to interfere with expeditious movement. This has been called the policy of short-routing of freight. It was frequently referred to by Mr. McAdoo in reports and public statements as an important reform instituted under federal control. In the writer's opinion the importance of this factor has been much overestimated. It is true that the annual reports of the regional directors contain references to large savings in car miles. These, at very best, are estimates, and even if they were correct, the estimated savings were but a fraction of one per cent of the total car miles. In practice it was found that the traffic suffered least delay when moved via the normal routes. A shifting of the load from the longer to the shorter route frequently found the latter underequipped for the overload, and resulted in congestion.

Savings based on estimated reductions in car miles were in many cases entirely neutralized by the higher cost of moving the cars via the shorter and more congested routes.[1]

To some extent the strain caused by the unusual volume of export freight traffic was lessened by the work of the Exports Control Committee. It consisted of a representative of the United States Railroad Administration, a major general representing the army, a rear admiral representing the navy, a steamship executive representing the Shipping Control Committee, and a traffic expert representing the Allies. This committee was created on June 11, 1918, for the purpose of determining the probable amount of freight to be exported for war purposes and to work out a plan for its most effective distribution through the several ports. As a result of its conferences, and in coöperation with the Railroad Administration and the Shipping Board, a substantial portion of the export freight, principally for the Allies, which normally would move through the North Atlantic ports, was diverted to the South Atlantic and Gulf ports.

Another phase of unification, familiar to the public, was in the consolidated ticket offices. In more than one hundred of the important cities in the country the "up town" selling of tickets, both railroad and Pullman, was concentrated in one office which took the place of a large number of separate ticket offices in each city. In New York and in Chicago more than one consolidated office was found necessary, but in the other cities the single central city office was substituted for the separate offices of the local and "off-line" roads. At the same time all arrangements between the railroads and tourist or similar agencies were canceled. In all, 101 consol-

[1] Cf. discussion below under "Public Service."

idated ticket offices were established. They took the place of 564 passenger offices which were in existence prior to federal control. In his report to the President, for the seven months ended July 31, 1918, the Director General estimated that the closing of the off-line agencies and the consolidation of ticket offices represented a yearly saving of $16,566,633, to which he added an item of $7,000,000 to be saved by the practical elimination of advertising, making a total estimated saving in the three items of $23,566,633.[1]

Much publicity was given to the Administration's policy of standardizing the design of locomotives and freight cars. Mr. McAdoo's statement that there were "2023 different styles of freight cars and almost as many different descriptions of locomotives," [2] appealed to the public imagination, as did also his announcement that a committee of experts of the Railroad Administration had agreed upon twelve standard types of freight car and six standard types of freight locomotive of two weights each. Obviously the process of standardization would make the problems of new construction much easier and eventually would reduce the cost of maintenance. In 1918 the Director General ordered 1430 locomotives and 1000 freight cars of standard design.

Under the terms of the contract between the Director General and the railroad companies the Director General was required to secure the approval of the corporation before he could permanently assign any of the new standard equipment to that corporation. There was much opposition to the universal adoption of these standards and long drawn out controversies over the assignment of the new equipment to the individual companies. The *Railway Age*, the leading technical

[1] On this point also compare what is said below.

[2] Report to the President, for seven months ended July 31, 1918.

railroad journal, devoted much space to criticism of the policy,[1] and much time and effort were expended by the spokesmen for the Administration in defending it.

An analysis of the conflicting views on the subject indicates, however, that the railroad companies had no quarrel with standardization as a principle. Practically all of the negative arguments attached to *the degree* in which the principle was applied. Many of the larger railroad systems, such as the Pennsylvania, the Union Pacific, and the Southern Pacific, had been following the principles of standardization for years, and the Master Car Builders' Association and the American Railway Association had made substantial progress toward standardization in freight car design. There was a natural resentment against the upsetting of these programs by the enforced adoption of new standards which had been somewhat hurriedly adopted by Administration experts of no greater professional standing than the experts of the larger individual systems, who had a more intimate knowledge of the peculiar local needs.

Many flaws may be picked in the details of the government standards. It can easily be shown, for example, that the requirements of an individual road cannot be efficiently met by any one of the twelve standard types of locomotive. On one road, for example, the lighter type of locomotive designed for slow freight service was not quite powerful enough to haul the train which the locomotive of local design could haul. The heavier type of standard locomotive, on the other hand, exceeded the capacity of the bridges. That road had to choose between a loss in train loading efficiency with the lighter type of locomotive, or undertake an expensive

[1] There was, of course, strong opposition from manufacturers of special parts or appliances. The specifications for new equipment were so drawn as to exclude certain of these specialties and to favor others as, for example, in the case of friction draft gear for freight cars.

program of bridge strengthening or rebuilding. If it accepted the second alternative it faced the fact that the additional capital expenditures for bridges would earn returns only on the heavier trains hauled by the relatively few new locomotives and could not avail itself fully of the additional capacity of its line until all of its own standard of locomotive were displaced by the heavier standard of the United States Railroad Administration.

In another case a road with heavy grades had worked out a design of locomotive which with a lighter type as a helper on the maximum grade gave a maximum of power utilization both on the minor grades with one locomotive and the major grade with two locomotives. In that case there was no possible combination with the new standards which would give the same degree of train loading efficiency.

It was plain, therefore, that the Administration's standards were too few in number to meet all of the requirements of the different physical and traffic characteristics of the 160 Class 1 roads in federal control. And it was equally plain that some compromise might profitably be made between a policy of arbitrarily fixing a few types to meet all conditions and a policy of individuality and regard only for local needs. Two or three times the number of types prescribed by the Administration would probably save nearly all of the advantages of standardization and at the same time would give each road the opportunity to select a type or types which it could use without loss of efficiency.

The case for the standardization of the freight car is stronger. Locomotives ordinarily are confined in service to the rails of the owning company. Freight cars are used in common under car service rules and the *per diem* rules agreement. They are repaired (with certain excep-

tions) on the road where the need of the repairs develops. The average freight car of an individual road is at home not much more than one-half of the time. Obviously if there is a common standard for the types of car used for the great bulk of the interchanged traffic, each road will be required to carry a much smaller stock of repair parts, and there will be a reduction in the time now lost by cars which are held while the repairing road is obtaining parts of special design.

Simplification of Accounting

The transition from private to federal control, the separation of the accounts as between the corporation and the government, and the provisions of the contract between the Director General and the railroad companies, necessitated a great deal of additional accounting work. Shortly after federal control began, and before the separation was made between federal and corporate accounting forces, the railroads were instructed to keep two sets of accounts — one reflecting federal transactions, the other reflecting the affairs of the railroad company.[1] When the federal and corporate forces were split, the former was concerned only with the federal accounts; but very heavy additional burdens were placed upon the accounting department by the special accounts and statistics required by the Director General, the Division of Accounting, the Division of Capital Expenditures, and other departments of the Administration. In July, came still further burdens, from the order requiring the standardization of operating statistics in greater detail than had been customary on the majority of roads.

As an offset to these additional burdens, several inno-

[1] General Order No. 17, April 3, 1918.

vations were ordered which had the effect of reducing the normal accounting requirements pertaining to inter-road transactions. Since the policies of unification, diversion of traffic, pooling of freight cars, and many other practices tended to destroy the normal relation of operating expenses to operating revenues of an individual road, several accounting short-cuts were authorized. The government was not particularly interested in the absolute accuracy of the accounts of an individual road as a unit in relation with other roads. It was primarily interested in the combined results for all of the roads as a national system. The diversion of traffic and the unification of facilities and equipment worked against the individual showing of a part of the railroads and correspondingly improved the showing of the others.

The first step was the adoption of the universal interline waybill.[1] The plan provided that all freight moving as through shipments over the rails of two or more railroads was to be billed through from point of origin to destination *regardless of the absence of joint rates*. This method eliminated a great deal of re-billing at junction points, reduced the delay to freight on that account, and simplified revenue accounting.

Then came the instructions [2] to discontinue the technical and arithmetical checking of bills as between roads in federal control. This change was meant to apply particularly to the tens of thousands of inter-road bills each month for freight claims, car repairs, equipment rents, joint facilities and the like, and the statements pertaining to the settlement of joint revenues on interline freight and passenger traffic. The billing road was enjoined to use care in the preparation of the bill and the debtor road was obliged to assume its technical and arithmetical accuracy.

[1] General Order No. 11, March 16, 1918. [2] Ibid.

The next step [1] provided simplified bases for the apportionment of interline freight revenue. Instead of continuing the former plan under which each road determined from the waybill records the balance due it from each road and the amount of its indebtedness to each road, the debit or credit balances as between roads were to be based on what are termed "road to road per cents." These per cents were to be computed for each route from the records of 1917. In effect the new plan provided for a division of joint freight revenues as between carriers in the same proportions that such revenues on interline freight traffic were divided in the year preceding federal control. Later on a "short cut" was authorized for the simplification of interline passenger revenues.[2]

A further reduction in accounting work was authorized on June 12th[3] when accounting for freight car hire (*per diem*) was discontinued as between roads in federal control. Simplified bases were provided also in the same order for the making of bills for joint facilities, and under date of October 5th a plan for reducing the accounting work connected with the exchange of bills for repairs to equipment was made effective.[4]

Standardization of Operating Statistics

Under the rules of the Interstate Commerce Commission the accounting practices of the railroads have been standardized for many years. To a very limited extent this standardization applied to the statistics of performance — locomotive miles, train miles, car miles, ton miles, and passenger miles. But no steps had been taken to bring about uniformity in the field of operating

[1] General Order No. 21, April 22, 1918. [3] General Order No. 31, June 12, 1918.
[2] General Order No. 32, June 29, 1918. [4] General Order No. 47, October 5, 1918.

statistics. Each road had gone its own way in developing the reports which were designed to show the efficiency of the various operating activities and to reflect unit costs.

The need for uniformity in this field as well as in the field of accounting was realized when an attempt was made during the first three months of federal control to put together a composite picture of operating results from the large number of special reports which had been sent to the Director General at his request. There was so much diversity in the content of the reports and in the bases used that it was impracticable so to combine the figures as to show the results for a region or for the railroads as a whole.

To meet the needs an Operating Statistics Section was organized early in May and, effective August 1st, a system of standardized operating statistics was promulgated. While the new plan was designed primarily to supply the central administration and the regional directors with the necessary information for each road and each region, the forms were drawn so as to be equally valuable for intra-railroad purposes. As a result the complete statistical indices of performance and operating efficiency were made available to the operating officers of all railroads and to the public, as well as to the Railroad Administration, without the former uncertainties and qualifications as to bases and methods. The operating officers were furnished with much more information than they had ever before had concerning neighboring roads with which they could fairly make comparisons, and in the majority of cases the new reports gave them more information concerning their own roads than theretofore had been available to them.[1]

[1] See Annals of the American Academy of Political and Social Sciences, November, 1919, "The Accomplishments of the United States Railroad Administration in Unifying and Standardizing the Statistics of Operation," by present writer.

Passenger Service

With the United States Railroad Administration pledged to the single purpose of operating the railroads so that they would assist most effectively in war, it was inevitable that there would be a curtailment in service for civilian travelers and limitations upon the transportation of non-essential freight.

One of Mr. McAdoo's first public statements (that of January 5, 1918) as Director General dealt with the reduction in passenger train mileage. The Railroads' War Board had already made substantial reductions, but the Director General went much further. In May he approved a drastic rearrangement of the service west of Chicago. The reductions were estimated to save 11,728,000 passenger train miles per year. They were accomplished by abandoning duplicate service between Chicago and the Pacific coast cities and assigning to the short and direct routes to each city the fastest through service. Under this plan the Santa Fe was to be the preferred route to Los Angeles; the Chicago & Northwestern, the Union Pacific, and the Southern Pacific to San Francisco; the Burlington and the Northern Pacific to Portland, and the Chicago, Milwaukee & St. Paul to Seattle. Similar plans were adopted in other sections of the country as, for example, between Chicago and the Twin Cities, Chicago and St. Louis, and New York and Florida points. In the aggregate the savings in passenger train miles during the first seven months of federal control were at the rate of 67,290,482 per year. The Administration frankly attempted to discourage civilian travel; but its appeals apparently made little impression upon the public. The volume of passenger traffic grew

steadily and during the two years of federal control exceeded all previous records.[1]

In addition to the curtailment in passenger train mileage there was a drastic cut in the number of parlor cars and dining cars, as well as a reduction in the number of sleeping cars. The general policy was to run only the number of sleeping cars regularly assigned to each train and not to put on extra cars and run extra train sections except under unusual circumstances. Observation cars and Pullman smoking and buffet cars were practically eliminated, as were many other "frills" connected with the extra fare trains.

From the viewpoint of the public, the consolidated ticket offices had certain advantages. The traveler could purchase tickets, arrange for Pullman car reservations, obtain information, and secure other services at one central point for any or all of the routes available for his intended trip. In case the sleeping cars via one route were sold out, he could change to another route without going to another office. Tickets for points served by two or more railroads were honored via any route. On the other hand there were certain disadvantages. The very size of the office and of the volume of business transacted required a much larger number of clerks than had ever worked together in one ticket office. It took months to weld them into a smooth-working organization. At the hours of the peak load there was much standing in line, and trying delays. In a few offices, such as those in New York and Chicago, there was a subdivision of the office organization by roads or sections of the country. In the majority of cases, however, there

[1] Passengers carried one mile during the years 1917–19 inclusive, were: 1917, 39,361,369,062; 1918, 42,498,248,256; 1919 (partly estimated), 46,200,000,000. (Report of Director General Hines to the President for fourteen months ended March 1, 1920.) The figures include troop movements, but military traffic does not account for all of the increases in 1918 and 1919. The passenger miles of 1917 also included heavy troop movements in the latter part of the year.

was no such subdivision. A ticket clerk whose previous experience had been confined to one road or section had to become familiar with all roads or sections served by that office. This took time, and in the process there was a loss in the quality of service. The defects in the service of the consolidated ticket offices grew less obvious as the organization "found itself," and the clerks became more familiar with their broader range of work, but the typical traveler missed the former stimulus of competition between separate passenger-soliciting forces.

Freight Service

While the man who traveled was asked to make substantial sacrifices in the interest of the expeditious movement of troops and of war materials, it is doubtful if he contributed any more to the common cause than the average shipper of freight which was not included on the priority lists. The traffic for export or for other war purposes, which moved under priority orders, was such a large part of the total that the shipper of freight outside of the priority list — the man who was trying to carry on "business as usual" — had much to contend with. To keep a complete control of the freight situation and avoid congestions such as those of the last two or three months of 1917, the embargo method was so frequently used that the ordinary shipper was kept "guessing" as to whether his shipment would be accepted at all and if accepted when it would reach its destination.

The permit system was adopted under these circumstances, and had much to commend it. It was applied primarily to export freight but to a limited extent was applied also to domestic traffic destined to points in the congested areas. The system had much to do with the

reduction in the accumulation of freight at seaboard and prevented further blockades. Under the permit plan a shipment for a seaport or other designated destination would not be accepted by the railroads at the shipping point until a permit was issued, and the permit would not be issued until it was known that the consignee was prepared to receive the shipment. Under former conditions the shipper, in the absence of a specific embargo, could deliver his freight to the railroad regardless of the ability or inability of the consignee to take the freight on its arrival at destination. The new method in effect controlled the flow of traffic at the source and prevented accumulations of cars at destination, particularly at the seaboard. It proved of such value that the railroad companies, on the return to them of their lines, retained it as regards export traffic.

An important innovation was the "Sailing Day Plan"; better called the shipping day plan. It was applied to the movement of less than car load freight and was designed to bring about the better utilization of freight cars by securing a heavier average load per car. Schedules were worked out from the principal less than car load shipping points and freight of that class for certain destinations or certain transfer points was held for through cars which would run on specified days of the week. The daily loading of this freight to transfer stations, when the tonnage for one destination did not justify a through car, had caused congestion at many transfer points. Under the new plan the assembly of less than car load shipments into larger car load units reduced the number of transfers and saved some of the delay to freight.

Yet the plan was not generally approved by shippers, as it gave certain distributing centers an advantage over other competing distributing centers to common mar-

kets when the traffic from the first was greater than that from the second and therefore justified more frequent service.

The abolition of the off-line freight agencies took away a form of service which had not been appreciated fully until the offices were closed. While primarily freight soliciting agencies, they acted also as bureaus of information for the shipping public and as such were of much convenience to the shippers. The tracing of shipments was of real value. The New York representative of a western road would obtain reports of cars destined to or coming from points on his line and on request would keep the shippers informed of their location and probable delivery or arrival. The offices were clearing houses for various kinds of commercial information, and the soliciting forces naturally did their best to serve their patrons and create the good will so valuable in traffic relations. When it was made clear to the Railroad Administration that this feature of the off-line agency service was a real loss to the shippers, an attempt was made to give similar information in central freight information bureaus in important centers, but the substitute was regarded by the shipping public as poor.

Increases in Rates

It was clearly apparent when federal control began that the existing rate scale would not yield sufficient revenue to enable the government to earn the guaranteed rental. The power of the Director General to establish rates was not determined until the passage of the Federal Control Act. The Act gave him authority to initiate rates and regulations by filing the tariffs with the Interstate Commerce Commission, but the Commission was shorn of its power to suspend such rates

pending final determination of their justness and reasonableness. The Commission was authorized to hold hearings if complaints were made and, after such hearings to make such findings or orders as are authorized by the Interstate Commerce Act; but the Commission was also required to take into account the fact that the transportation systems were being operated under a unified and coördinated control and not in competition. It was provided further that when the Director General certified to the Commission that increased revenues were necessary to defray the expenses of federal control and operation, the Commission should take such finding and certificate into consideration in determining the justness and reasonableness of the Director General's changes in rates and regulations.

The Federal Control Act which contained this authority was not approved until March 21, 1918. Steps were taken at once to determine the extent and the form of the necessary increases. On May 25th an order was issued which in general terms horizontally increased freight rates about 25 per cent and advanced the passenger rate to three cents per mile. Where the existing rate was higher than three cents per mile no increase was ordered. Suburban fares were increased 10 per cent. The passenger fare increase as a whole was estimated to be about 20 per cent. A surcharge of one-half cent per mile for passengers using Pullman cars was also ordered. These were the only general rate increases initiated by the United States Railroad Administration, altho numerous adjustments in individual rates were made later, most of them resulting in reductions rather than increases.

To provide an effective organization for the adjustment of complaints concerning freight rates and regulations, 24 local and 3 general freight traffic committees

were created, upon which the public had representation. Proposed changes were passed by the local committee to the general committee and then to the Director of Traffic, with a copy to the Director of Public Service. Every change had to be approved by the two Directors, or, if they divided in opinion, the Director General was called upon to decide. The public representatives on these committees were usually selected by the shippers' organizations. Individually their votes had equal weight with the votes of the individual railroad members, but the public members were in the minority. The railroad members, therefore, controlled the majority recommendation but the minority influence was recognized. The arrangement did much to maintain amicable relations between the shipping public and the Railroad Administration during the trying period of the war.[1]

On one important task, begun a long time ago, substantial progress was made. For years the Interstate Commerce Commission has been pressing for action which would bring about uniformity in freight classifications, and the railroads had been struggling with the problem. As between the official, southern, and western classifications there had been many variations in the classification of articles and in the regulations which applied to the classification. Under the unification brought about by federal control there appeared to be an excellent opportunity to secure the necessary compromises between the railroads themselves and between shippers and railroads. The fact that any plan of uniformity meant losses to some of the railroads if the lowest classification in any territory were adopted uniformly and, conversely, meant higher freight charges to the shippers if the highest classification were adopted,

[1] For passenger rate matters three general committees were formed but on these the public was not represented.

had been the principal stumbling block in the path of progress. The Railroad Administration set about with vigor to achieve the desired uniformity, but nothing definite was accomplished in 1918. In 1919, however, under Mr. Hines' régime as Director General, a consolidated classification was presented to the Interstate Commerce Commission; Mr. Hines did not care to initiate it himself without the prior approval of the Commission. Vigorous opposition on the part of shippers developed at the hearings, and the Commission declined to approve the plan of re-classification because it appeared to have the effect of unduly increasing rates — the upward adjustments exceeding those which were downward. The Commission, however, gave its approval to the unification of the rules. Tho this in itself was an important step forward, it is to be regretted that the golden opportunity presented by the war period and federal control to solve an extremely troublesome problem was lost. The difficulties which lie in the path of a complete solution to the classification problem are now as great as they were before federal control.

Labor Problems

The relation between the railways and their employees is a subject by itself, too large for adequate treatment in the present discussion, which is concerned mainly with the administrative and operating problems that arose during the period of federal control. A brief sketch of the course of events will be enough to indicate the bearing of the labor situation on these problems.

The demands for large increases in wages which had been made upon the railways before federal control, received immediate attention from the administration. A commission of which Secretary Franklin K. Lane was

Chairman recommended in May, 1918, considerable increases of pay. The advances then recommended were greatest for those in the lower grades of the service, and were designed to bring an adjustment in accordance with the changed cost of living. In the same month a Board of Railway Wages and Working Conditions was instituted, composed of representatives of management and representatives of labor. On the recommendation of this Board, further adjustments were made in the course of 1918. The Director General of his own motion put into effect the principle of the 8-hour day, which had been established in 1916 by the Adamson Act. Some other adjustments were made, serving to equalize the wages of white and colored employees and those of men and women. The combined result was an increase in the number of employees and also an increase in the percentage which the payroll expenses bore to all operating expenses. On December 15, 1917, the total number of employees on Class 1 roads was 1,703,684; on January 15, 1919, the comparable number was 1,843,530, an increase of 139,846, or 8.2 per cent. The payroll expense constituted 61.48 per cent of all operating expenses in 1917; in 1918 it was 65.62 per cent.

The total of the increases granted during 1918 was estimated by Mr. McAdoo to be between $600,000,000 and $700,000,000. In the opinion of the present writer the higher figure still understates the extent of the increases, when account is taken of the various collateral increases and of the many changes in rules. The average increase in wages in 1919 was very nearly 50 per cent, a percentage probably less than that granted to employees in other industries with which the railroads competed.

Operating Results

As the railroads were commandeered by the government to meet a war emergency, a review of their traffic accomplishments during the year 1918 is of particular interest. It will be recalled that the railroads serving the North Atlantic seaboard were badly congested when the government took hold. At that time there were 62,247 loaded cars delayed short of their ultimate destination. In addition, there were 31,421 cars held at and west of St. Louis; 24,836 at or west of Chicago; 14,061 at or south of the Ohio River gateways; and 15,545 at or south of the Potomac River gateways. These made a total of 148,110 loaded cars held short of destination. In the majority of cases they were destined to the relatively small area embraced within a line drawn from Portland, Me., through Albany, Rochester, Harrisburg, and Baltimore.

The operating methods employed to relieve this congestion have already been described. These methods, in spite of the unusually severe weather of January, resulted in the practical clearing of the accumulations by May 1.[1]

During this period the food situation in the countries with which the United States was associated in the war was exceedingly acute. The needs were estimated by the Food Administrator to be not less than 1,160,000 tons per month. Translated into other terms that meant between 30,000 and 40,000 loaded cars per month to be moved to the seaboard and the same number of empties to be moved westward. The actual exports during the months of January, and the estimated exports for February, fell far short of the minimum requirements, and

[1] Annual Report, Division of Operation.

a forecast of the situation in March was even less encouraging. Vigorous steps were taken by the Railroad Administration to give preference to the transportation of foodstuffs, so that by March 15 the vessel capacity of the Allies was satisfied and there was a surplus awaiting boats.

A serious situation existed also with respect to bituminous coal. At the beginning of federal control there was an actual shortage of cars at the mines; there was a lack of systematic distribution; and there was a serious dislocation of the New England supply because of the withdrawal of the coastwise water service. The coal-carrying water equipment had been commandeered by the navy and the already overburdened rail lines to and in New England were called upon to handle something more than 150 per cent of their normal coal tonnage. An acute situation existed also in the northwest. Through methods which would have been difficult to apply except under unified governmental control the Railroad and the Fuel Administrations together worked out a plan which gave the needed relief. The coal production in February of 1918 exceeded the tonnage of February, 1917, and thereafter during the year 1918 the coal situation was well in hand. The greatest factor toward improving the situation was the zoning of distribution. Each of the producing districts was assigned a certain fixed area within which to market its coal. Shipments outside of that area were not allowed except under a permit from the Fuel Administration. The plan eliminated a waste of transportation by prohibiting unduly long hauls to destinations which could be served by nearer producing districts. The cross-hauling which had prevailed to a considerable degree, theretofore, was eliminated, and coal-carrying equipment was more efficiently utilized. The zoning plan furnished also an

incentive for utilizing coal available in the Plains states, which otherwise would not have been produced in competition with the higher grades of other districts.

Of all of the governmental demands, the movement of troops was naturally given the greatest attention. The Railroads' War Board, as has already been stated, was praised by the Secretary of War for the effective and satisfactory manner in which the railroads had responded to the heavy calls upon them for transportation of troops. The Railroad Administration took over intact the organization which had been handling that phase of operation for the Railroads' War Board and made it the Troop Movements Section.[1]

Between January 1, 1918 and December 31, 1918 the railroads moved 7,395,310 soldiers, sailors, and marines, an average of 616,276 per month. The maximum movement was in July, when 1,147,013 troops were moved. These figures do not include the large number of officers and men who traveled at their own expense while on furlough and to whom the Railroad Administration granted a rate of one cent per mile.

This troop movement required the running of 13,912 special trains, with an average train journey of over 800 miles. The average train consisted of 12.2 cars and carried 443 men with their equipment and supplies. The speed of the special troop trains was limited to 20 miles per hour in the interest of safety. Considering the magnitude of the movement and the fact that these were extra trains for which special arrangement had to be made, the record shows a commendable freedom from accident. Sixteen out of the nearly fourteen thousand

[1] George Hodges, who had charge of the organization before and after federal control, and who died suddenly in the spring of 1919, was awarded posthumously the Distinguished Service Medal as a recognition of the very successful results which followed the coördination of this important work.

trains met with accidents, which caused the death of 36 men and injury to 314.

There are no complete data to show the extent of freight traffic for government purposes separate from that of other purposes. We must be content to view the freight service as a whole.

It might be thought that a comparison of the ton miles produced in 1918 with those produced in 1917 would give a satisfactory answer to the question: Was the Director General able to operate the railroads as efficiently in 1918 as they were operated during the last year of private operation? The ton miles of 1917 were the greatest on record and the volume of traffic during the last three months was so great as to cause serious congestion and inability to operate efficiently with the overload. If, therefore, the Director General could produce as many or more ton miles, and at the same time could move the freight with less congestion and less delay, it would seem that federal operation in the emergency was justified by the results.

On further thought, however, it will appear that the volume of ton miles does not furnish the complete answer. Is it not conceivable that the Railroad Administration might have been successful even if the total production in ton miles was less? Whether it produced as many ton miles as were produced under private operation is one test; but the real test is this — did it produce in requisite volume the particular kind of ton miles that were essential to the war?

An examination of the records of performance indicates clearly that the Railroad Administration met both tests. The ton miles of 1918 exceeded those of 1917 and all previous years, and the particular kind of traffic which was essential for war purposes was satisfactorily transported. The volume of tonnage for non-military

purposes was reduced to save the facilities for essential tonnage; but in the aggregate the performance of 1918 passed all previous records.

The following summary of results is taken from the report of the Operating Statistics Section. The figures do not agree exactly with those of the Interstate Commerce Commission, as the latter include returns from a few Class 1 roads which were not retained by the government.

FREIGHT TRAFFIC MOVEMENT AND CAR PERFORMANCE [1]

Class 1 Railroads. Calendar Years 1918 and 1917

Item	Year 1918	Year 1917	Per Cent Increase
Average miles of road	228,729	228,633	...
Ton miles (millions)	434,998	427,342	1.8
Freight train miles (thousands)	637,924	654,580	*D 2.5*
Loaded freight car miles (millions)	14,928	15,816	*D 5.6*
Empty freight car miles "	7,128	6,717	6.1
Total freight car miles "	22,056	22,533	*D 2.1*
Cars on line daily, serviceable	2,291,797	2,230,057	2.8
Cars on line daily, total	2,430,786	2,363,309	2.9
Averages			
Ton miles per train mile	682	653	4.4
Ton miles per loaded car mile	29.1	27.0	7.8
Per cent loaded to total car miles	67.7	70.2	*D 3.6*
Car miles per car day	24.9	26.1	*D 4.6*
Ton miles per car day	490	495	*D 1.0*

It will be noted that the increase of 1.8 per cent in ton miles was accomplished with less train miles and with less car miles. Train miles show a decrease of 2.5 per cent, and car miles show a decrease of 2.1 per cent. The average train load and the average car load show substantial gains — 4.4. per cent increase in the train load and 7.8 per cent increase in the car load. Two items in

[1] *D* denotes decrease. Ton miles include both revenue and non-revenue tons. The statistics include the performance of mixed trains.

the tabulation show losses in efficiency: the percentage of loaded to total car miles and the average miles per car day were less than in 1917.

The increases in the train load and in the car load are explained in part by the larger proportion of freight which moves in large car load lots, such as coal, ore, iron and steel products, grain, and similar commodities, and the smaller proportion of merchandise and other commodities which move in relatively light car loads. Freight traffic was divided roughly into two classes — essential and non-essential. The former was given preference. The essential freight included the heavy commodities which assist in making a favorable record in car and train loading.

With respect to the larger proportion of empty car miles and the loss in car miles per car day, the decreases in efficiency are partly explained by the policy of arbitrarily moving the empties in solid train lots and of attempting to have the empties available at originating points in advance of the needs. The increase in the car load, also, was purchased at some sacrifice in car movement per day when cars were held for the heavier load.

The ultimate index to the efficiency of freight car utilization is "ton miles per car day." This is the resultant of the car load, the per cent of loaded car miles, and the car miles per car day. It will be noted that the gain of 7.8 per cent in the load was not sufficient to offset the losses of 3.6 per cent in loaded proportion and 4.6 per cent in car miles per day. The net loss in ton miles per car day was 1.0 per cent.

In passenger service as in freight service, the performance in 1918 broke all previous records. Including the movement of troops, the passengers carried one mile in that year were 42,498,248,256, compared with 39,-

361,369,062 in 1917. The greater part of the 8 per cent increase is accounted for by military traffic, but there was a slight increase in civilian passenger traffic, notwithstanding the curtailment in passenger train service and the appeals of the Railroad Administration to "stay at home."

Financial Results

The net operating income of the railroads under federal control for the year 1918 fell short by approximately $245,000,000 of the amount which the government paid in the standard return rentals. This deficit includes losses in the operation of the Pullman car lines, refrigerator car lines, steamship lines, and inland waterways, as well as the expenses of the central and regional offices of the Railroad Administration. It does not include interest on expenditures for additions and betterments made by the Railroad Administration but paid for by the companies, nor is account taken of claims for undermaintenance. The discussion of these auxiliary features will be reserved for the second article, in which the complete results of the federal control period will be reviewed.

A complete and exact statement of the financial results for 1918 is not available in separate form, but summaries of the income account were published monthly by the Operating Statistics Section. They apply only to Class 1 roads and do not include any of the auxiliary services, such as Pullman lines and steamboats; nor do they include the expense of the regional and central offices of the Administration. The figures, however, give a sufficient indication of the relation between the aggregate net operating income of Class 1 railroads and the rentals which were paid by the govern-

ment. The difference between the two amounts represents much the greater part of the deficit under federal control.

CONDENSED INCOME ACCOUNT[1]

Class 1 Railroads in Federal Control. Years 1918 and 1917

Item	1918	1917	Increase or Decrease	
			Amount	Per Cent
Operating revenues	$4,842,695,884	$3,988,827,671	853,868,213	21.4
Operating expenses	3,939,315,122	2,808,544,956	1,130,770,166	40.3
Net operating revenue	903,380,762	1,180,282,715	*D 276,901,953*	*D 23.5*
Net operating income	688,200,083	960,492,111	*D 272,292,028*	*D 28.3*
Standard return	890,335,685			
Per cent net operating income to standard return	77.3			
Deficit	202,135,602			

The deficit was due to an increase in operating expenses which was relatively and absolutely much more than the increase in operating revenues. It will be recalled that a general increase in freight and passenger rates was made effective in June. The wage increases, however, while awarded in May, were made retroactive to January 1. In his final report to the President, Director General Hines estimated that if the advances in freight and passenger rates had been effective from January 1, 1918 the additional revenues in 1918 would have been $494,000,000. This amount, of course, would have wiped out the deficit and would have left a surplus of nearly $292,000,000.

It was impracticable, however, to increase the rates at the very beginning of federal control. The reasons why

[1] *D* denotes decrease. These returns include the results of operation of 150 Class 1 railroads with an aggregate road mileage of 230,769. Net operating income as used here corresponds with its definition in the Federal Control Act, viz., net operating revenue, minus railway tax accruals and uncollectible railway revenues, plus or minus the net balances for equipment rents, joint facility rents, and miscellaneous federal income items (if any). The standard return used here is the figure as it appeared at that time. Since then it has been changed slightly by adjustments.

they were not made effective until June have already been given. The record, therefore, must stand as given — a deficit of over $200,000,000.[1] This deficit and the deficit in 1919 are frequently referred to as the "cost" of government operation.

As this phase of the question is to be discussed in the final review of the results for the entire period of federal control, it may be passed here with the brief comment that so far as the ultimate cost to the public was concerned it made little difference whether the deficit in 1918 was met from the public treasury, or was avoided (as might have been done) by an earlier or a larger increase in rates. In either case the public pays the bill. The higher cost of railroad operation, however met, was an element in the cost of the war; and the amount of the deficit is not large when we consider the cost of other large scale government activities incident to the war. The outstanding fact is that during 1918, when adequate transportation was so vitally necessary, the railroads functioned effectively as a part of the war machine, and they served the public reasonably well under very trying conditions. The writer believes that the results achieved under federal control during the war were more favorable than would have been possible under a continuation of private control.

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[1] This is the loss on the operation of Class 1 roads. Including all activities of the Railroad Administration, and its organization costs, the deficit for 1918 was about $245,000,000.

REVIEW

SOME RECENT STUDIES ON THE INDUSTRIAL REVOLUTION [1]

CONSIDERING the importance of the subject it is surprising that nothing like a complete history of the English Industrial Revolution has yet been written. As a factor in determining the character of modern civilization it is easily as important as its two great contemporaries, the revolution in America and the revolution in France; yet compared with them it has received scant attention from serious historians. Outside of Arnold Toynbee's lectures, published nearly forty years ago, and M. Paul Mantoux's *La Révolution industrielle au XVIII^e^ Siècle en Angleterre*, which has never been translated and is now out of print, it is hard to recall any published work which even undertakes to deal with the subject as a whole. And Toynbee does little more than indicate the importance of the subject, while Mantoux's admirable monograph hardly develops it past its beginnings. Cunningham, of course, has good chapters on the Industrial Revolution in his *History of English Industry and Commerce*, and there is matter of value in some of the general histories of the period, notably in J. R. M. Butler's *The Passing of the Great Reform Bill*, and in Professor Halévy's *Histoire du peuple anglais au XIX^e^ siècle*. But none of these can pretend to anything like completeness. The fact is that the subject is a tremendous one, the interest in it comparatively recent and a good deal of in-

[1] J. L. Hammond and Barbara Hammond, —

The Village Labourer, 1760–1832. A Study in the Government of England before the Reform Bill. New impression. Longmans, Green & Co., 1919.

The Town Labourer, 1760–1832. The New Civilisation. Fourth impression. Longmans, Green & Co., 1919.

The Skilled Labourer, 1760–1832. Longmans, Green & Co., 1919.

Edgar S. Furniss, The Position of the Laborer in a System of Nationalism: A Study in the Labor Theories of the Later English Mercantilists. Houghton Mifflin Co., 1920.

tensive research work in the sources still remains to be done before anything like a comprehensive treatment of it can safely be attempted. We need more biographies of the type of Graham Wallas's *Life of Place*, more histories of industry of the quality of Chapman's *Lancashire Cotton Industry*, and more careful studies of contemporary political and social movements like Veitch's *Genesis of Parliamentary Reform*, and Beer's *History of English Socialism*. It is always dangerous to analyze such a complex movement as the Industrial Revolution into its parts, and to undertake to study those parts separately. But the sooner that is done the sooner we shall be in a position to make a satisfactory synthetic judgment.

Mr. and Mrs. Hammond in their three volumes on the English laborer have undertaken to present a picture of the condition of the English wage earning classes during the most intense period of the Industrial Revolution. In so doing they have made probably the most important contribution to the history of that movement that has appeared since M. Mantoux brought out his volume nearly fifteen years ago. But before proceeding to a consideration of their work it is worth while taking note of the excellent short monograph by Professor Edgar S. Furniss which has just been published as Volume XXX of the Hart, Schaffner, and Marx Prize Essays in Economics under the title *The Position of the Laborer in a System of Nationalism*. The sub-title, "A Study in the Labor Theories of the Later English Mercantilists," reveals more exactly the nature of its contents. Professor Furniss has limited his investigations to the period between 1660 and 1775. He stops at just about the time when the Industrial Revolution may be said to have begun. But his discussion throws a good deal of light upon the orthodox attitude towards labor during the Revolution because that attitude was largely the expression of the mercantilist theory.

It is not surprising to discover that the later mercantilists regarded labor as they regarded all other factors which entered into production from the point of view of its contribution to national wealth. The surprising fact is that they were

often disposed to regard it as the sole source of wealth. At times they came near anticipating Ricardo's views and were not far away from the fundamental position of Karl Marx. But they differed radically from Marx in this, that they were entirely concerned with the amassing of wealth by the nation and not at all with its distribution among the nation. They agreed that labor produced wealth, and because it produced wealth they insisted that it should be exploited for all it was worth. Their feeling about workhouses for the poor illustrates admirably their point of view. They advocated workhouses for the poor, not because they wanted to relieve the poor, but because they wanted to utilize to the utmost the production capacity of the nation. They did not deplore poverty as such. A good many of them expressed the view that poverty was necessary in order to keep labor to its tasks. Arthur Young remarked: "Everyone but an idiot knows that the lower classes must be kept poor or they will never be industrious." On similar grounds the high price of foodstuffs, particularly of corn, was justified. If corn was harder to buy the laboring man would have to work harder to get it. Amusements and recreations were begrudged him for like reasons. At every turn the emphasis was laid upon keeping steady pressure on labor to increase output.

Curiously enough there seems to have been very little disposition among the later mercantilists to consider the possibility of wearing out the human machine by excessive labor. The assumption almost always was that the longer a man was kept at it the more he would do. Nor was there much attention paid to labor as a consumer. One or two, like Sir Dudley North and David Hume agreed that a prosperous laborer was a good customer but most of the mercantilists had their eye fixed singly upon the foreign buyer and considered an increase in national wealth wholly in terms of an increase in the favorable balance of trade. It was with the foreign market in mind and with a view to meeting the foreign competitor that many of them argued in favor of low wages, and even of supplementing wages by poor relief. They maintained that since low wages enabled the English producer to undersell his competi-

tor in the foreign market and by so doing to increase the national wealth that low wages conferred a national benefit for which it was proper that the nation should pay. From this point of view the system of poor relief developed under the so-called Speenhamland Act became a kind of national bounty paid to the export industries.

Such, in brief, were the views about labor which the later mercantilists handed on to those who followed them and by such arguments a good deal of what was bad in the treatment of the laboring man during the Industrial Revolution was justified. With a clear recognition of the importance of labor as a factor in the production of national wealth there went an almost complete disregard of the welfare of the laborer himself — an attitude closely analogous to that of the owner of the goose which laid the golden eggs and nearly as fatal in its consequences.

Of course it must never be forgotten that the old-fashioned economist held himself bound to eliminate from his calculations all other factors except those directly contributory to the production of wealth. It would be unfair to assume that the later mercantilists were altogether indifferent to humanitarian considerations or that the labor policy which emerged from their more or less academic dissertations was the accepted labor policy of their times. Professor Furniss does not attempt to do more than define their position, but those who read his work must take care that they do not attribute to the eighteenth century English world at large the opinions maintained by the exponents of a thoroly materialistic creed. The eighteenth century was a good deal kinder than these writers would seem to indicate, and a good deal more considerate of the rights of the laborer as a man and a citizen. But it was, nevertheless, too much inclined to regard him merely as the most important cog in the national industrial machine, a cog, moreover, which could be kept on turning indefinitely, without rest and almost without lubrication.

The three volumes by Mr. and Mrs. Hammond have to do with the village laborer, the town laborer, and the skilled laborer during the period between 1760 and 1832. The first

of them appeared nearly ten years ago; the third, late last year (1919). Both the first and the second have been three times reprinted. It is gratifying to discover that work of this quality, which must commend itself strongly to every serious student of the subject, has been so favorably received by the wider reading public. But this is not altogether surprising. Mr. and Mrs. Hammond are painstaking research students, but they are something more than that. Like their friends Professor Graham Wallas and Mr. R. H. Tawney they are as well masters of the art of historical writing. What they set down is not only always worth study, but it is also almost always pleasant and easy reading. It is refreshing to discover once again that economic history need not be such dull stuff as most of those who write it, particularly in America, make it out to be.

The volume on the village laborer deals specifically with the effect of the eighteenth century enclosure movement upon the English peasantry. It has little to do with the Industrial Revolution in the precise sense of the term, but Mr. and Mrs. Hammond are not concerned about that. To them the agrarian and the industrial change belong together. They find both proceeding from very much the same impulses, dominated by much the same spirit, and directed toward much the same ends. In each, the well-to-do in pursuit of wealth ruthlessly exploit the weakness of the poor. The town laborer puts up a stiffer fight for his independence than does his country brother, but both succumb in the end. To the Hammonds it is all part of the same tragedy whether the scene be laid in the field or in the factory, in deserted villages or in crowded city tenements. To such a tragedy the opening chapters of *The Village Labourer* form an appropriate prologue. They set forth the ways by which political power in eighteenth century England came to be concentrated in the hands of the town and country gentry, who dominated the central government by controlling the House of Commons and dominated the local government by monopolizing the office of justice of the peace. There can be little doubt that this was the case. But the point which Mr. and Mrs. Ham-

mond particularly wish to drive home is that the gentry consistently employed their political power for the purpose of advancing their economic interests. They convey the impression that all laws were framed in the interest of landlords and employers, and all judicial decisions in the local courts were favorable to their side of the case. There is much to be said in support of this view, but the Hammonds put it altogether too strongly. It would not be hard to point to plenty of legislation favorable to the laboring man during this period and unfavorable to his masters — the anti-trucking acts for example. And there were plenty of decisions by the local courts in his favor. It is significant in this connection to recall the efforts of the laborers themselves to have their wages fixed by the justices of the peace. Had they been convinced of the antipathy of the justices, this would have been the last thing they would have asked for. Had their employers been convinced of it this would have been the last thing they would have opposed. As it was they did oppose it vigorously, and in the main successfully. They failed, however, in the case of the Spitalfields silk weavers who, in 1773, secured the right to have their wages fixed by their magistrates. The consequence was not, as Mr. and Mrs. Hammond would lead us to expect, that things went very badly with them, but that things went very well. They became in fact "an aristocracy among wage earners."

Too much can easily be made of exceptions like this which prove the rule, but do not necessarily invalidate it. It is, however, pretty clear that Mr. and Mrs. Hammond are rather obsessed by Disraeli's idea of "two nations" within England, and are rather too much disposed to interpret the economic life of the period which they are considering in terms of class warfare. It has long been a common fault among the English historians that they have approached the problems of the past with a view to finding support for their convictions about contemporary issues. Their disposition has too often been to make of past history present politics. This fault is conspicuous in a good deal of what has been written during the past generation about the history of the English laborer.

Those who have been attracted to the subject have been, if not pronounced socialists, at any rate strongly antipathetic to the present organization of industrial society. They have traced to the Industrial Revolution the roots of most of the evils which they attribute to the modern so-called capitalistic system and in their discussion of it they have been mainly concerned with laying these roots bare. This attitude of mind is quite apparent in the writings of J. A. Hobson and of Professor Graham Wallas, and there is evidence of it in Mr. and Mrs. Hammond's work. It comes out strikingly in those chapters in their volume on the town laborer in which they undertake to describe the mind and conscience of the rich. According to their reckoning the mental attitude of the rich towards the poor was well represented by those who distorted the arguments of Ricardo and Malthus in order to justify low wages, poverty, and misery; and the conscience of the rich by those who, like Hannah More, William Wilberforce, and the Methodists, preached to the poor the gospel of resignation. But it would be easy to select other men and women whose opinions and whose convictions were of a diametrically opposed character. The same class of society that fathered William Wilberforce fathered also Romilly and Whitbread, Bennet and Sheridan, Lord King and Lord Suffield. The same generation that quoted the iron law of wages heard and applauded Robert Owen. The same sort of House of Commons that passed the anti-combination laws, repealed them. There was in fact no common mind of the rich and no common conscience of the rich. The gulf which separated a man like Charles James Fox from a man like the Duke of Wellington was far wider than that one which separated Fox from Thomas Hardy the shoemaker. There were reactionaries among the rich, many of them, but there were also many reformers. The governing rich class, as Mr. and Mrs. Hammond reveal it, was a class quite unconscious of its own shortcomings, absolutely satisfied with the political and industrial *status quo*, and absolutely averse to change. How then do they account for the fact that this same class produced the Great Reform Bill? They don't. It is one of the

fundamental defects of their three volumes that they reveal almost no trace of the great progressive forces which were at work among the governing class during the very period which they describe and which were slowly making straight the way of modern English democracy.

Over against the smugness of the rich the Hammonds set the dejection and misery of the poor. They call attention to the concentration of the population in towns which was one of the striking features of the Industrial Revolution and enlarge upon the evils attendant on the subjection of the immigrant countryman to factory discipline and grimy town life. The picture which they draw is familiar enough tho they have added some lurid details. If one were to ask them why it was that the countryman left his cottage and his hedgerows for that kind of life they would probably answer that he was forced out of the country by economic necessity. Yet it is hard to believe in the light of present day experience that economic necessity alone was responsible. Any one who has tried to coax the modern town laborer from shabby tenements into trim suburban villas has discovered that the laborer finds something in his tenement which he is not particularly anxious to exchange for blue skies and green fields. And that something is probably human society. Town life is not without its compensations; factory discipline, even, is not without its compensations. Grant that the laborer of the eighteenth century did encounter all the miseries which the Hammonds have depicted; at any rate he was no longer isolated, no longer lonely, no longer doomed to vegetate with his crops. The factory town for all its grime and ugliness teemed with social opportunity. It brought men together who had never been together before. It provided contact between mind and mind. It made cheap schools possible, it made postoffices and cheap newspapers possible, it made clubs and unions and coöperative societies and libraries and art galleries possible. In brief, it made social and political and industrial organization among the wage earners possible. And the factory discipline, notwithstanding its undoubted hardships, contributed to the same end. It taught men to

work together toward a common end and revealed to them the value and the strength of coöperative effort. It developed, in fact, *ésprit de corps*. From this point of view the factory town was a factor of some importance in the social and political progress of the English workingman.

Of course it was no thanks to the capitalist that this was so. His notion was simply that of getting workers nearer his plant. He was, generally speaking, indifferent if not hostile to everything which would have made of the town a pleasant and healthy place to live in. He fenced in the open places, discouraged public pastimes, frowned upon popular education. Mr. and Mrs. Hammond are right in reckoning the hideous conditions of town life in the score of their indictment of him. Yet perhaps if their interest had been a little less concentrated upon bringing him to book they would not have forgotten what an important part in the social and political progress of the last hundred years the factory town has played. It is a mistake to assume that because the capitalists intended no good, and immediately perhaps, accomplished no good, that therefore no good was to proceed from those miserable aggregations of humanity which they drew together. Great good in fact did proceed and it is open to question whether on the whole, considering the intellectual and spiritual forces which emerged from it, the dirty, unhealthy factory town was not worth all the misery which went into its making.

As a matter of fact, if the Hammonds had but marked it, the influence of the new towns upon the social and political progress of the English laboring classes was already beginning to reveal itself in the very period which they have under consideration. The town laborer, as they see him, is a poor, half-starved, spiritless fellow. They do not see him in 1792 aroused and inspired by the French Revolution, and flocking to join Thomas Hardy's correspondence societies. They do not see him reading Tom Paine and Will Cobbett, and listening to Orator Hunt. They do not attend his debating clubs, or join his reading circles, or his coöperative societies. They hardly hint at the enormous expansion of his trade unions, or

if they do they fail to grasp the tremendous significance of all these things. There is hardly a period of equal length in the whole of English history which is so important as this one in the political and social progress of the English laboring classes. Then, it can fairly be said, his political consciousness was born. Then, almost for the first time, he began to think of himself not merely as a subject but also as a citizen. All that he was to be in the century which succeeded he began to dream of then. But of this there is hardly a word from Mr. and Mrs. Hammond. They leave the laboring man in 1832 at very much the same place where they found him in 1760. They do not see, or at any rate, they do not record any progress. They record his efforts, his agitations, his riots, and his strikes, but to them it is all simply a futile beating of wings against the cage.

In many respects the concluding volume on *The Skilled Labourer* is the most valuable one of the three. It is, in the first place, much more historical in its tone, and much more concerned with describing conditions as they existed than with fixing the responsibility for them. In the second place it contains more that is really new. A great deal of it has been dug out of contemporary newspapers and other equally obstinate material, but it has been composed so skillfully that the hard spade work which must have gone into the making of it hardly appears. About two-thirds of it is devoted to the history of labor in the various textile industries. In fact, barring one single chapter on the coal miners of the Tyne and Wear, no other industry is considered. It would perhaps be unreasonable to complain that Mr. and Mrs. Hammond have limited their attention to the textiles, tho it is a trifle disappointing to discover that they have not attempted to retrieve some of the other industries from the neglect which they have long suffered at the hands of English economic historians.

What Mr. and Mrs. Hammond mean by the history of labor in particular industries is generally speaking the history of the efforts of labor to better its lot, in the main to increase its wages. Their chapters on this subject form a valu-

able supplement to Mr. and Mrs. Webb's *History of Trade Unionism*, and they are written from much the same point of view. One of the surprising facts which they reveal is the amount of organization which the skilled workers were able to maintain during the time when the anti-combination laws were still in force. Another equally surprising revelation is the amount of disagreement that there was among employers on the question of wages. Mr. and Mrs. Hammond have rather given us to understand in their earlier volumes that the employers presented a united front against the demands of labor. It is abundantly clear from this volume that such was not the case. Indeed it sometimes appears that the workers and the more liberally minded employers actually coöperated to force less liberally minded employers to increase wages. But these are merely observations by the way. In the main the story of labor in the textile industries of this time is one of strife in which inchoate labor organizations wrestle with associations of employers and almost invariably lose.

Three chapters in this third volume narrate the history of that spectacular campaign of machine smashing which usually goes by the name of the Luddite Risings. These are exceptionally valuable chapters for the student. They contain what is probably the best analysis of that confused and incoherent movement that has been written. If they have any defect it is that the Luddites are not sufficiently closely related to the general conditions which called them forth. Certainly the acute business depression of 1811 had a good deal to do with them, as did probably the American embargo of the same year. The measures taken to suppress them are developed at considerable length and serve to introduce the concluding chapter on the government spy system and the career of the notorious Mr. Oliver.

Mr. and Mrs. Hammond in their treatment of this subject reveal more conspicuously perhaps than anywhere else the bias which runs through their entire work. In their insistence upon the class struggle they fail to take account of the very complicated character of the period with which they are dealing, and of the many diverse elements which went into the

making of it. To modern eyes the industrial problems of those days assume proportions which they almost certainly did not reveal to the eyes of contemporaries. The average Englishman of the late eighteenth and early nineteenth centuries was probably much more concerned about the question as to whether or not England would be able to hold her own against France. It must not be forgotten that those times were in the main times of war, and that during a considerable part of them England was fighting for her very life against the greatest military genius that the world had perhaps ever seen. Nor must it be forgotten that even after France had become frankly imperialistic the French cause continued to be identified with the democratic propaganda set on foot during the earlier wars of the French Revolution. On that account any movement in the nature of a democratic protest against the *status quo*, whether political or religious or industrial, savored of treason. It is probable that even among the laboring classes there was a good deal more enthusiasm for the cause of "Church and King" than there was for "Liberty, Fraternity, Equality." We have had our modern equivalent of this attitude of mind during the late war. Possibly if the records of our federal secret service were searched, stories not unlike that of Oliver would be discovered. At any rate there can be very little doubt that a good many of the measures taken against labor and particularly against labor organizations during the times with which Mr. and Mrs. Hammond are concerned were dictated far more by political than by industrial fears. Mr. Oliver was not the tool of capitalists, he was the tool of a government so panic-stricken that it saw incipient revolution in every manifestation of discontent. He can no more be considered without reference to the French Revolution and the Napoleonic wars than can the recent treatment of "undesirable aliens" in America be considered without reference to the Russian Revolution and the World War. It was, perhaps, unfortunate, that the Industrial Revolution got tangled up with foreign revolutions and foreign wars the way it did. It was certainly unfortunate that the progress of the world toward social as well as political

democracy suffered a serious relapse because of the association between democracy and France on the one hand and between France and Napoleon on the other. But so it was and no judicious historian of those times can afford to ignore it. It would be going too far to say that Mr. and Mrs. Hammond have ignored it. Their fault lies rather in their failure to allow it sufficient weight in forming their judgments.

The pity of it is that historians of their caliber still find it necessary to write human history in terms of their own political and social creed. Time was when history was written in terms of the conflict of religious creeds. Other times were when it was written in terms of the conflict of political theories. It is easy to explain why this was so and to censure the old historians for their inability to free themselves from the predilections of their own times. But it is not at all certain that the historical writers of our generation have been any more successful in this regard. They avoid the religious and the political bias, but too many of them are possessed by an economic or a social bias no less obstructive to the attainment of objective truth. Whether objective truth be indeed attainable in human history is a matter past finding out, but it will hardly be attained by those who approach the past with a view to verifying their judgments of the present.

CONYERS READ.

NOTES AND MEMORANDA

PHILADELPHIA AND THE EMBARGO OF 1808

THE year of the embargo was critical in the economic history of the United States. During the great war in Europe, especially in the first phase from 1792 to the Peace of Amiens a decade later, America as the chief of neutrals had built up a carrying trade of vast proportions. The 1,000,000 or more tons of shipping engaged in this trade constituted an important interest for the nation, and one which was paramount for a state like Massachusetts owning as it did a third of the total.

Among the mercantile community, accordingly, the action of our government in replying to the Berlin and Milan Decrees and the Orders in Council of 1806 and 1807 which greatly hampered commerce, by an embargo which prohibited it wholly, was viewed with consternation.[1] And in proportion as the mercantile class dominated the economic life of their communities the embargo was execrated as the knell of American prosperity. As a result something of a tradition has grown up in American history as to the hard times produced by that "ill-judged" measure.

But if the embargo offered small comfort to commerce, it gave a wholly new impetus to manufactures. And herein lies the explanation of a sudden prosperity enjoyed by certain commercial cities at the very time when their sisters and rivals were most depressed. It was not that their shipping was less hit, but rather that their opportunities for a transfer of capital to manufactures were greater. This seems to have been especially true of the commercial cities of Pennsylvania

[1] This feeling was not, of course, universal. Thus William Gray of Salem, Mass., the greatest merchant of his day, heartily supported the embargo.

and Maryland, doubtless in part because of the great demand for manufactured articles arising from the rapidly developing Trans-Allegheny region. Baltimore is an example of a commercial city suddenly enlarging the field of its interests. The Baltimore newspapers during the year of the embargo have numerous advertisements of and other references to rapidly expanding manufactures. But Philadelphia is a more conspicuous example of a commercial city — she had something like a twelfth of the shipping tonnage of the United States — able, in spite of the gloom among the purely mercantile elements, to develop a prosperity which was the wonder of the times.

Even the opposition press was obliged to concede a measure of prosperity. "The embargo," declares the *United States Gazette* of October 8, 1808, "has as yet produced *comparatively* little inconvenience in this city and its neighborhood. During the last winter, we began to suffer from the domiciliary visits of labourers, *in forma pauperis*, who could not find employment and were obliged to beg; but, generally, the stores, laid in by poor men before the embargo, were sufficient 'to keep want from their doors' until the spring opened; since when, the unexampled improvements in our city have given constant employment to eight or ten thousand of them."[1] Philadelphia was, in fact, thanks to manufactures and in spite of commerce, in the midst of a wholly unprecedented boom.

A rather playful explanation of this era of construction, involving the building of 1,000 new houses[2] at Philadelphia alone in the single year of the embargo, attributes it to the prosperity of the Philadelphia lawyers. To these virtuous citizens the embargo brought a blessing in disguise. The very act which restrained commerce multiplied marine law suits, and their effect upon the gentry of the bar is humorously described by Horace Binney, one of its own distinguished ornaments. "The stoppings, seizures, takings, sequestrations, condemnations, all of a novel kind, unlike anything that had

[1] United States Gazette, October 8, 1808.

[2] Annals of Congress, vol. xix, pp. 100–103.

previously occurred in the history of maritime commerce — the consequence of new principles of national law, introduced offensively or defensively by the belligerent powers — gave an unparalleled harvest to the bar of Philadelphia. No persons are bound to speak better of Bonaparte than the bar of this city. He was, it is true, a great buccaneer, and the British followed his example with great spirit and fidelity, but what distinguished him and his imitators from the pirates of former days was the felicitous manner in which he first, and they afterwards, resolved every piracy into some principle of the law of nations, newly discovered or made necessary by new events; thus covering or attempting to cover the stolen property by the veil of the law. Had he stolen it and called it a theft, not a single law suit could have grown out of it. The underwriters must have paid, and have been ruined at once and outright. But he stole from neutrals and called it lawful prize; and this led to such a crop of questions as nobody but Bonaparte was capable of sowing the seeds of. For while he did everything that was abominable, he always had a reason for it, and kept the world of the law enquiring how one of his acts and his reasons for it bore upon the policy of insurance, until some new event occurred to make all that they had previously settled of little or no application. In many instances the insurance companies got off; in others, tho they failed, it was after a protracted campaign in which, contrary to compaigns in general, they acquired strength to bear their defeat. In the mean time, both in victory and defeat, and very much the same in both events, the lawyers had their reward." [1]

It is hardly necessary to remark that tho Philadelphia lawyers were reaping a harvest that has made their name a byword for shrewdness and success, this could not represent a net gain to the community. The real expansion of Philadelphia lay in industrial enterprise, and progress in this direction appears to have more than compensated for losses commercial.

Manufactures were assuming an altogether fresh variety and significance. The Philadelphia *Price Current* devoted

[1] Charles Chauncey Binney, Life of Horace Binney, pp. 60, 61.

to them an article which produced a local sensation, and which the editor at once forwarded to Jefferson "to prove that by the Presidents originating partial deprivations, he has ultimately bestowed on his country immense and imperishable benefits." [1]

The enclosure, which must have given keenest satisfaction to the harassed Jefferson, is not quoted here because of its length. But the long list of Philadelphia manufactures includes carpets, and calicoes, shawls, and bedspreads, earthenware in variety, glassware, soap, lead and shot, and a wide range of chemicals.

Files of the Philadelphia *Aurora* show that manufactures in iron, weavers' reeds, several kinds of cotton cloth, and Germantown products in stockings, socks, gloves, hosiery, and cotton and woolen yarn were all contributing to American self-sufficiency and to the enrichment of their entrepreneurs.

It is thus apparent that Philadelphia prosperity in 1808 was not a mere shifting of wealth from merchants to their lawyers, but a genuine progress, resting upon an active and diversified industrial basis. As Charles Jared Ingersoll summarized it, "Who that walks the streets of Philadelphia and sees, notwithstanding a twelve months stagnation of trade, several hundred substantial and elegant houses building, and the labouring community employed at good wages, who reads at every corner advertisements for workmen for factories of glass, of shot, of arms, of hosiery and coarse cloths, of pottery and many other goods and wares; who finds that within the last year rents have risen one-third, and that houses are hardly to be had at these prices; that land is worth, as Mr. Brougham observes, much more than it is in Middlesex; in a word, who perceives, wherever he goes, the bustle of industry and the smile of content; who, under such circumstances, that is not too stupid to perceive, and too prejudiced to believe when he does perceive, can doubt the solid capital of this country?" [2]

[1] Jeffersonian MSS., Library of Congress, Editor of Philadelphia Price Current to Jefferson, November 7, 1808.

[2] Charles Jared Ingersoll, A View of the Rights and Wrongs, Power and Policy of the United States of America, p. 49 (published 1808).

Nicholas Biddle, also, tho he has less to say about the embargo and its effects than one would expect from so important a man of affairs, confirms Ingersoll's estimate of Philadelphia prosperity. Writing to a friend in Paris, he says, "You would scarcely recognize Philadelphia, so much has it grown and improved. Among your former acquaintances, Cadwalader is always here and prospering. His wife has just presented him with a third child. Chauncey is making a fine fortune, and surely no one deserves it more than he. As for politics, our actual position is not the most agreeable. The embargo presses heavily on the people, but it has been put in execution without difficulty, and as the people is very sane, the session of Congress soon to meet will be peaceably awaited. In spite of this the embargo appears to have wrought some change in New England, where the elections have terminated in favor of the Federalists. There is even an appearance . . . that the Government of the United States will pass once more into the control of the Federalist Party, or at least that the embargo will be raised before very long. In all these matters I do not mingle. After my long absence, it is impossible to become a very zealous partisan, and I am occupying myself with my profession." [1]

Interesting testimony this is to the possibility of living in 1808 without worrying over the embargo, its wisdom, or its consequences, tho no Philadelphian could quite ignore the prosperity his own city was harvesting.

If confirmation of these estimates of Ingersoll and Biddle is needed, it is to be found in a communication of William Short, a friend of Jefferson, to the President. Short possessed a handsome fortune, and like Biddle, would have seen little to recommend in the embargo, had it proved as generally ruinous as its enemies alleged. He writes, "And this City (Philadelphia) has really acted as the government could wish on the subject of the embargo — I speak of those who are considered as of opposition politics & who are numerous — They frequently & publicly speak their determination to sup-

[1] Nicholas Biddle Papers, Library of Congress, vol. i, 1775–1809; Nicholas Biddle to M. de la Grange, September 26, 1808.

port it, & if on a jury to punish with rigor the violators of it. I have more than once heard it affirmed & not contradicted, that if the merchants of this City were assembled; confined to Federalists alone, nine out of ten would approve the embargo, & of the Tenth disapproving, most of them would be men without capital." [1]

In Philadelphia, as elsewhere, the ruin of powerful commercial interests brought a real and somewhat widespread distress. But in Philadelphia, much more than in many other localities subject to similar commercial losses, men found compensation, and frequently much more than compensation in the develoment of a large scale industrialism. On this basis was reared the superstructure of building operations which made Philadelphia the wonder of the times, and at least one great commercial city toward which Jefferson could point for the vindication of his system.

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[1] Jeffersonian MSS., Library of Congress. William Short to Jefferson, August 27, 1808.

BOOKS RECEIVED

Ashley, Percy. Modern Tariff History. New York: E. P. Dutton & Co. 1920. pp. 365. $5.00. (Third edition.)

Barnich, G. Essai de Politique Positive basée sur L'Energétique Sociale de Solvay. Brussels: Lebèque & Cie. 1919. pp. 413.

Bernhardt, Joshua. Government Control of Sugar. New York: Macmillan. 1920. pp. 272. $2.50.

Bondam, Richard. Le Mal Social et ses Remèdes. Paris: Société Mutuelle d'edition. 1920. pp.381. 6 *fr.* 50.

Boyle, James E. Speculation and the Chicago Board of Trade. New York: Macmillan. 1920. pp. 277. $2.50.

Bullock, C. J. Selected Readings in Public Finance. Boston: Ginn & Co. pp. 920. $4.00. (Second edition, revised and extended.)

Carver, Thomas Nixon. Elementary Economics. Boston: Ginn & Co. 1920. pp. 400.

Chapin, F. Stuart. Field Work and Social Research. New York: The Century Co. 1920. pp. 224. $1.75.

Douglas, Archer Wall. Merchandising Studies of the States. New York: Ronald Press. 1920. pp. 178.

Dunning, William A. A History of Political Theories from Rousseau to Spencer. New York: Macmillan. 1920. pp. 446.

Goodrich, Carter L. The Frontier of Control. New York: Harcourt, Brace & Howe. 1920. pp. 277. (With an introduction by R. H. Tawney.)

Hare, Lancelot. Currency and Prices. London: P. S. King & Son, Ltd. 1920. pp. 74. 2*s.* 6*d.*

Hart, Joseph K. Community Organization. New York: Macmillan. 1920. pp. 230. $2.50.

Hill, John Wesley. Abraham Lincoln, Man of God. New York: G. P. Putnam's Sons. 1920. pp. 416. $3.50.

Hobson, J. A. The Morals of Economic Internationalism. Boston: Houghton Mifflin Co. 1920. pp. 69. $1.00.

Hodge, Albert C., and McKinsey, J. O. Principles of Accounting. Chicago: University of Chicago Press. 1920. pp. 389. $3.00.

Keir, Malcolm. Manufacturing Industries in America. New York: Ronald Press. 1920. pp. 324. $3.00.

Kirkbride, Franklin B., Sterrett, J. E., and Willis, H. Parker. The Modern Trust Company. New York: Macmillan. 1920. pp. 549. $6.75. (Fifth edition, enlarged and revised.)

Leland, Simeon E. Taxation in Kentucky. Lexington, Ky.: University of Kentucky. 1920. pp. 170. $1.00. (Studies in Economics and Sociology, No. 1.)

Liefmann, R. Grundsätze der Volkswirtschaftslehre. Berlin: Deutsche Verlags-Anstalt. 1919. (Vol. I, 708 pp.; Vol. II, 858 pp.)

Mattern, Johannes. The Employment of the Plebiscite in the Determination of Sovereignty. Baltimore: Johns Hopkins Press. 1920. pp. 214. (Johns Hopkins University Studies.)

Park, Joseph H. The English Reform Bill of 1867. New York: Longmans, Green & Co. 1920. pp. 285. (Columbia University Studies.)

Phillips, Chester A. **Bank Credit.** New York: Macmillan. 1920. pp. 374. $4.00.

Prince, Samuel Henry. **Catastrophe and Social Change.** New York: Longmans, Green & Co. 1920. pp. 151. (Columbia University Studies.)

Scott, James B. **The Project of a Permanent Court of International Justice and Resolutions of the Advisory Committee of Jurists.** Washington: Carnegie Endowment for International Peace. 1920. pp. 235. (Report and Commentary.)

——. **The United States of America: A Study in International Organization.** New York: Oxford University Press. 1920. pp. 605. (Carnegie Endowment for International Peace.)

Slosson, Edwin E. **Creative Chemistry.** New York: The Century Co. 1920. pp. 311.

Tawney, R. H. **The Acquisitive Society.** New York: Harcourt, Brace & Howe. 1920. pp. 188.

Williams, John H. **Argentine International Trade under Inconvertible Paper Money, 1880–1900.** Cambridge: Harvard University Press. 1920. pp. 282. $3.50.

Wood, George A. **William Shirley, Governor of Massachusetts, 1741–1756.** New York: Longmans, Green & Co. 1920. pp. 433. (Columbia University Studies.)

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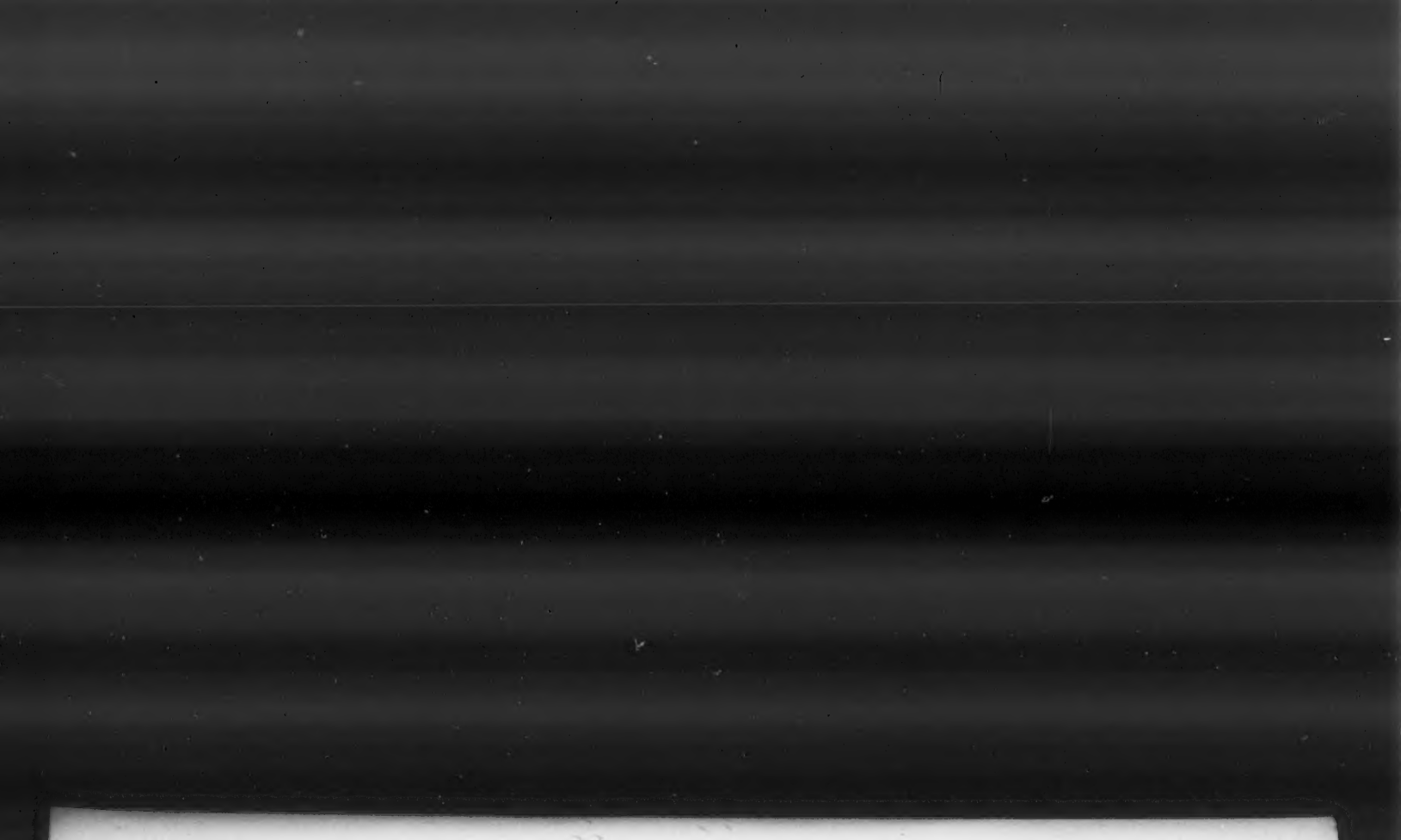
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